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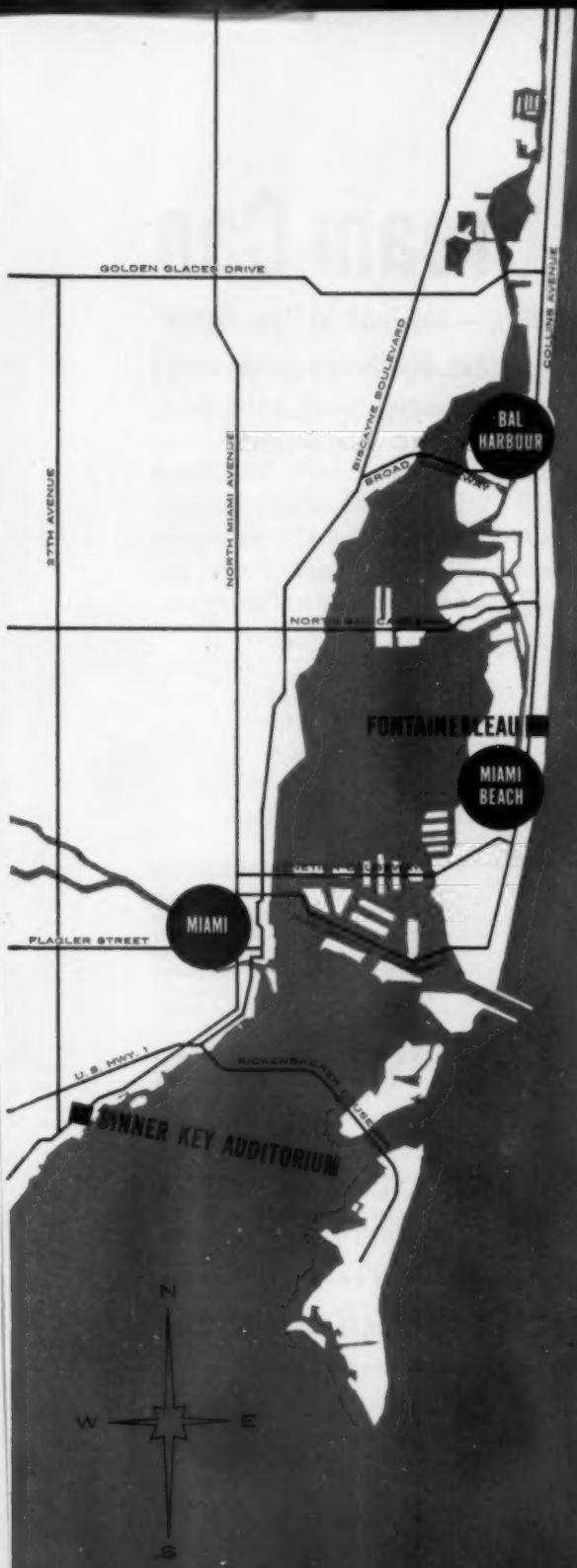

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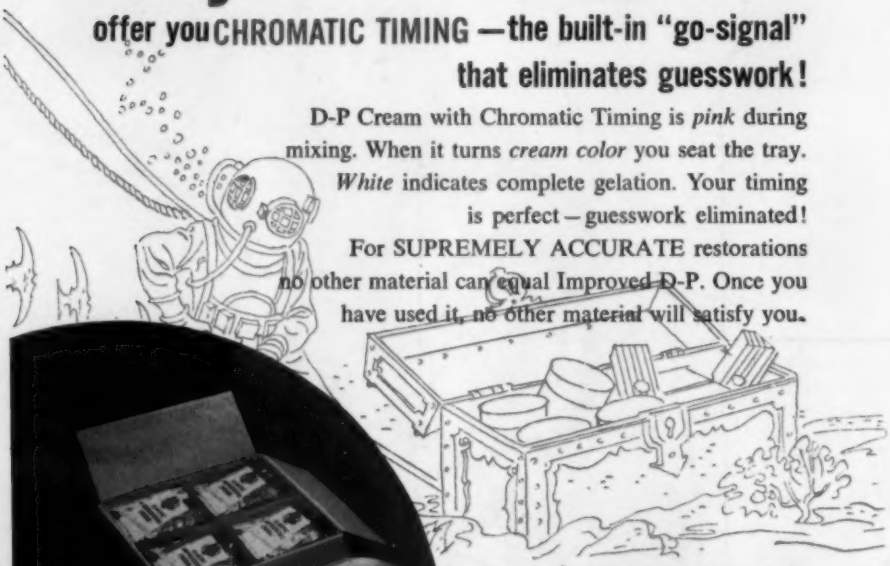

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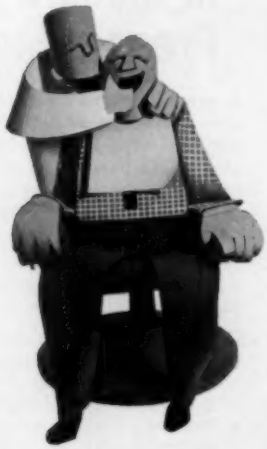

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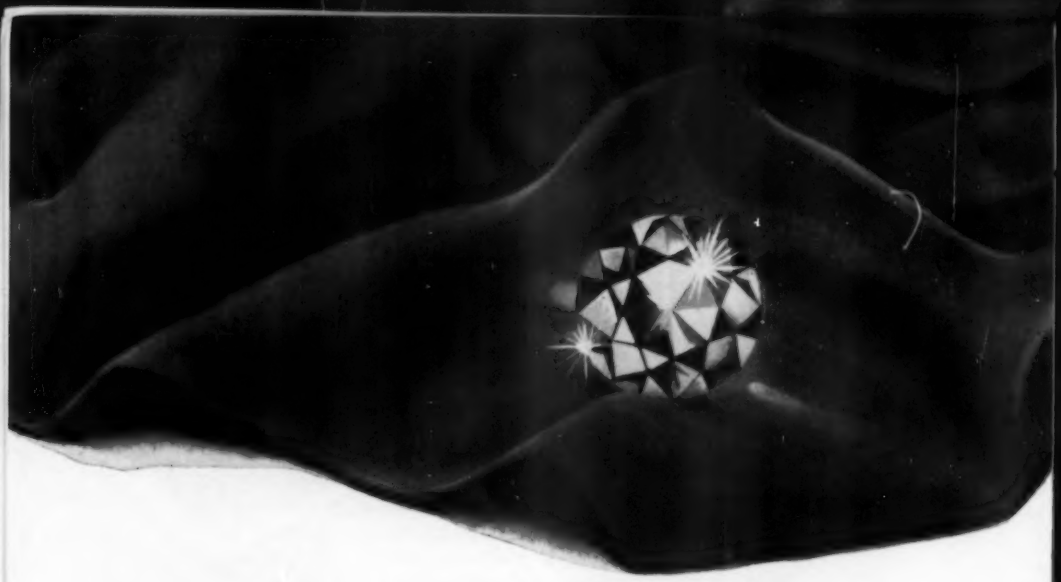

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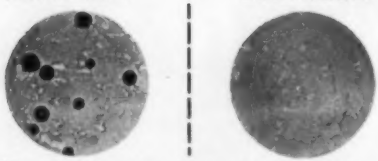

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Overbite adjustment in the adult dentition

Lowell N. Peterson, D.D.S., and Robert E. Oslar,† D.D.S.,*
San Francisco

The overbite is probably the most common deviation from the ideal occlusion in civilized man.[1-5] In contrast, the edge-to-edge bite is characteristic of ancient and modern primitive races.[6,7] In young contemporary primitive Eskimos, overbites of 2 to 4 mm. are seen, but by age 20 these overbites have been completely eliminated by abrasion.[8]

Overbite has been defined as "overlapping of the upper anterior teeth over the lowers in a vertical plane."[9] Some definitions only include the incisors; however, the entire anterior segment, including the cuspids, should be considered. That is to say, an overbite may involve any one or more of the six anterior teeth. According to Sorrin,[10] overjet is the term used to denote "the horizontal distance between the lingual surface of the upper anterior teeth and the labial surface of the lower anterior teeth" when the teeth are closed.

Wylie[11] has classified overbite as "slight," "medium," and "severe" (Fig. 1). Slight overbite is an overlapping of 2 mm. or less. Medium overbite is gingival to this line but does not touch the cingulum. Severe overbite he described as

> . . . every case where the mandibular incisor met the cingulum of the maxillary incisor or the gingival tissue lingual to it. The fact that 66 out of 90 orthodontic cases . . . have either medium or severe overbites, testifies to the

*Clinical professor of periodontia and chairman of department, School of Dentistry, College of Physicians and Surgeons.

†Assistant clinical professor in periodontia, School of Dentistry, College of Physicians and Surgeons.

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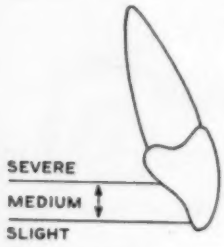

Fig. 1 • Degree of overbite (After Wylie)

frequency with which the closed bite is encountered in orthodontic practice.

Various authorities differ as to the amount of overbite which could be considered favorable. Schweitzer[12] stated the belief that " . . . a normal overbite . . . would mean an overlapping . . . of not more than one-third and possibly less . . ." Neff[13] made correlations of the mesiodistal diameters of the six upper and lower anterior teeth. He considered a 20 per cent overbite as ideal. Williams[14] considers that the normal overbite is 1.5 mm. or less.

Orton and Lischer[1] examined 2,982 university students and found only 132 with "anatomically correct, unmutilated dentures." The dentitions of 52 of these students were studied in detail. Only 11 had an approximately ideal occlusion and none had an overbite of more than 1.5 mm. Five had an end-to-end bite. They conclude that:

. . . there can be no continuous contact of all the teeth in the denture during the gliding movements of the lower teeth, in those dentures in which the overbite is in excess of 2 mm., with no compensating overjet.

That the overbite is a major clinical problem in many fields of dentistry has long been recognized.[15] In complete denture prosthetics, function in the anterior segment of the arches is usually minimized by decreasing the overbite or increasing the overjet.[16-18] If protrusive balance of the dentures can be achieved, it is desirable for stability.

In restorative dentistry, the overbite is frequently perpetuated by the new inlay, bridge or partial denture. This is unfortunate as it is then difficult or impossible to adjust the overbite without damaging the prosthesis. An example is the porcelain jacket crown which is repeatedly fractured when the overbite is unfavorable. Equilibration should always be done before the replacement is made.[19,20]

According to Popovich,[9] "Overbite is one of the most common problems that confront the orthodontist." Treatment is sometimes difficult or not practical,[21,22] and when treated, the condition may recur.[23]

In periodontics, the overbite has been associated with periodontal lesions and degeneration,[24,25] pathological migration,[10,26] and, in extreme instances, trauma to the gingival tissues on the lingual aspect of the maxillary teeth[27] and, rarely, the labial tissues of the mandibular teeth.

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25. Baume, L. J. Physiological tooth migration and its significance for development of occlusion. IV. Biogenesis of overbite. J.D. Res. 29:440 Aug. 1950.

26. Glickman, I. Clinical periodontology. Philadelphia, W. B. Saunders Co., 1953, p. 306.

27. Goldman, H. M. Periodontia, ed. 3. St. Louis, C. V. Mosby Co., 1953, p. 220.

The overbite can contribute to periodontal breakdown in the following way. Trauma to the gingival tissue on the lingual aspect of the upper incisors may result from direct contact but, more frequently, it is the result of hard foods such as crusts of bread. One such incident can cause detachment and the beginning of pocket formation. Repeated injury and inflammation causes deepening of the pocket and resorption of bone. This results in lengthening of the clinical crown and shortening of the clinical root. Secondary occlusal trauma[28] and loosening of the teeth may result. The upper incisors move forward which is the direction of least resistance.

Pathologic drifting and diastemas are most frequently observed in the upper incisor region associated with an overbite. The probable reason is that the forward thrust or lateral shift of the mandible causes an outward movement of the upper teeth which is accelerated in the presence of periodontal disease. The coarse resistant type of food and the manner of incision may also have an adverse effect as has been shown clearly by Jankelson and co-workers.[29]

Conversely, the force on the lower incisors is favorable because it is backward or more nearly in the direction of the long axis. Thus, when there is mutual support, drifting is less likely.

Diastemas of the upper incisors are a particular problem and usually have the following characteristics:

1. A pocket develops on the lingual and proximal side of the tooth or teeth involved. Teeth drift away from the pocket because of the destruction of the transseptal and other fibers of the periodontal membrane and from pressure of the granulation tissue within the pocket.[30]

2. Secondary occlusal trauma, accentuated by extrusion of the teeth, increases the overbite and the horizontal loading.[31]

Boyens[30] has demonstrated that diastemas can be closed if the occlusion is adjusted and the pocket is eliminated surgically. This has been verified by our own experience (Fig. 2, 3, 4, 5, 6). The overbite should be corrected first and then rechecked postoperatively for several weeks until the occlusion is stabilized.

In approximately one third of the instances, the diastemas closed partially or completely. In most of the other instances, the spaces did not close but they did not open further.

TECHNIC OF EQUILIBRATION

1. The overbite is marked with a sharp pencil by drawing a line on the labial aspect of the lower teeth. The incisal edges of the upper teeth are used as a guide.[1] The teeth must be in maximum centric closure. The measurement is taken arbitrarily on the lower left central incisor (Fig. 7, 8).

2. Articulating paper is used to determine the centric, lateral and protrusive points of contact. Each of these should be checked separately; different colors may be used if necessary.

3. The protrusive biting position is studied to determine the condition functionally and esthetically. Many persons slide their mandible forward to a position of comfort or convenience only. An exaggerated forward movement is necessary to detect tripping and isolated contacts (Fig. 9, 10). This may also be noted by placing the index finger over the labial surfaces of the upper teeth while this movement is made. The number of teeth which contact in the extreme protrusive position should be observed.

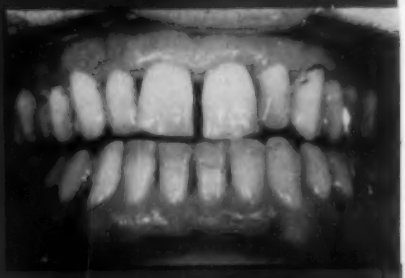
4. With a pencil, a line is drawn to mark the minimum amount to be re-

28. Orban, B. J. Biologic principles in periodontics, part 3. D. Digest. 57:359 Aug. 1951.

29. Jankelson, B.; Hoffman, G. M., and Hendron, J. A. Physiology of stomatognathic system. J.A.D.A. 46:375 April 1953.

30. Boyens, P. J. Pathologic drifting; treatments for spontaneous regulation. D. Digest 57:159 April 1951.

31. Box, H. K. Twelve periodontal studies. Toronto, University of Toronto Press, 1940.



moved from the upper teeth so as to: (a) establish a straight horizontal incisal line to which the lower teeth can be occluded; (b) establish a satisfactory esthetic appearance; (c) bring more teeth into function.

5. The teeth are cut to these lines. Care must be taken not to get them too short; it is safer to remove small amounts at first. In instances where the curve of Spee is steep, the third molar might interfere if the overbite is reduced too much. Occasionally extraction of an extruded third molar is indicated and desirable to reduce the steepness of the curve. With the mandible in protrusive position the teeth are checked for esthetics and the possibility of increasing functional contacts.

6. The lingual slopes of the upper teeth are beveled as indicated by the carbon marks in order to increase the contacting surfaces. More grinding is done toward the incisal edge and less toward the point of centric contact. The point of centric contact is not ground except where it is desired to make space to retrude the teeth as in correction of a diastema. Backward finger pressure is used to recheck with carbon paper. This is most necessary with loose teeth so as to keep them in line of occlusion and it helps to accentuate the marks. All carbon marks are removed before the next step.

7. The lower incisors and new carbon marks are studied to determine if grinding is necessary and can be done without taking the teeth out of centric position or function. Grinding of the lower teeth is usually not indicated but may be done under the following circumstances.

When there is overbite without overjet, the carbon marks will extend onto the labial surface. These teeth may be shortened slightly without eliminating a centric contact. If any lower incisors are prominent labially and are marked heavily by the carbon paper, they may be flattened by grinding and polishing without shortening the tooth.

The purpose is to bring the tooth or teeth into a better line of occlusion.[32] (Fig. 11). The labial incisal angle is not beveled as this is the cutting edge. Beveling also creates an incline plane which would favor extrusion of the tooth. The labial incisal bevel as suggested by some is incorrect.

When an overbite with overjet is present, the carbon marks are only on the incisal edges. These teeth should not be shortened but may be disked to eliminate unevenness and to improve the final fitting of the upper and lower anterior teeth in all functional positions.

Lower incisors not in occlusion which are crowded lingually and have extruded may be shortened to improve esthetics (Fig. 9).

8. All carbon marks are removed and the teeth are rechecked in centric, lateral and protrusive jaw movements. Also lateral movements are checked with the jaw in the protrusive incisal position. Final adjustments are made by additional shortening or beveling. Lower incisors should be beveled on the lingual slopes. This restores the anatomic form and improves the cutting edges (Fig. 12, 13).

9. Disks are used for the finishing and polishing. The natural appearance is restored to the teeth by rounding sharp corners, especially the distal incisal angles of upper central and lateral incisors.

EVALUATION OF TREATMENT

Since 1945, the incisal overbite has been adjusted according to this technic in more than 300 patients. A statistical analysis of the first 100 patients (selected alphabetically) was made in order to determine the range of overbite and the amount of reduction necessary. The range is shown in Table 1. The median value is 4.4 mm. In 77 per cent of the patients, the overbite was between 3 and 6 mm.

The amount of reduction that was necessary to equilibrate the overbite is shown in Table 2. The arithmetic mean

Fig. 5 • Centric position after elimination of periodontal pocket by gingivectomy and diastema closed

(average of total number) is 0.883 mm. The median value (half are less, half are more) is 0.8 mm. The 50 per cent range (in which a fourth are less than the lower limit of the range and a fourth are more than the upper limit of the range) is 0.6 to 1.1 mm. inclusive.

COMMENT

In the most extreme instance, the patient had an overbite of 12 mm. which was reduced by 2.4 mm. The patient with the slightest overbite (only 2.0 mm.) had an extreme overjet which was reduced 0.9 mm. No other patients who required correction had less than 2.5 mm.

It can be seen, therefore, that the amount of shortening in most instances

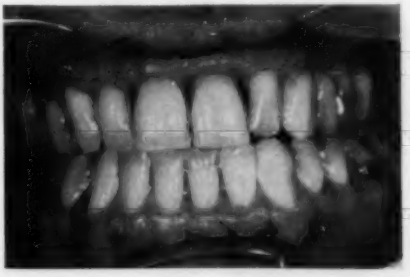


Fig. 6 • Protrusive position. Overbite reduced to 3.0 mm.

Fig. 7 • Centric occlusion

Fig. 9 • Extreme protrusive position showing isolated contact with lower lateral incisor

is not great. Much of the final adjustment is accomplished by beveling the lingual slopes of the upper teeth which does not reduce the overbite but, in effect, increases the overjet.

DISCUSSION

Overbite adjustment is only a part of the development of a satisfactory occlusion by whatever means may be employed—grinding, restorations or replacements.

When equilibration of the occlusion by selective spot grinding is to be done, a definite plan should be followed. The purpose and objective should be explained to the patient by such statements as "It is desirable to have as many teeth in contact as possible in all the jaw positions," or, "we are dealing with very slight differences in the range of fractions of a millimeter, so that very little loss of tooth substance is required." The term "grinding" should be avoided in discussing the purpose with the patient. Instead, it is better to say: "The tooth is being reshaped to improve the fit or to relieve the strain."

The first step is to establish the teeth in true centric closure on the hinge axis. Many times this can be done with coarse disks. This gives the patient a degree of comfort which he has never before experienced, and even the skeptical person has greater confidence in the entire procedure. Occasionally the overbite is increased slightly by this correction.

32. Beube, F. E. Periodontology; diagnosis and treatment. New York, Macmillan Co., 1953, p. 286.

Fig. 8 • Protrusive position showing overbite mark

Fig. 10 • Protrusive position corrected

The second step is reduction of the overbite. The patient is given a hand mirror and any undesirable conditions are pointed out such as movement of individual teeth, uneven or chipped incisal edges, single or isolated contacts when the jaw is in protrusive position, or uneven distribution of carbon marks. The amount of cutting to be done is indicated with a pencil mark. Overbite reduction is the logical second step because in extreme instances the overlapping interferes in the lateral movements.

The third step is to adjust the occlusion in the right and left lateral movements. From a periodontal standpoint, the most important immediate objective is to relieve interferences which may be or are traumatogenic. It is possible but not necessary to achieve lateral balance in the natural dentition. A satisfactory compromise is achieved when more teeth can be brought into contact in the various jaw positions so that relief is given the weak or loose teeth.

The final step is to recheck the occlusion in all positions—centric, protrusive and lateral. The roughness of all ground surfaces should be eliminated with fine sandpaper disks or polishing wheels.

The following objectives should always be kept in mind:

1. Esthetics is very important and many times can be improved. Esthetics should not be sacrificed to strive for an ideal occlusion; for example, excessive grinding to bring the entire natural dentition into protrusive balance is seldom necessary and is difficult to achieve. The maximum practical result with the minimum loss of tooth structure should be obtained. Sensitivity of teeth is seldom a problem.

2. The stresses should be redistributed over as many teeth as possible. The theoretical concept is expressed in Rothwein's law of diminishing returns,[33] but it has a very practical significance in the incisal bite. Briefly stated, it is as follows:

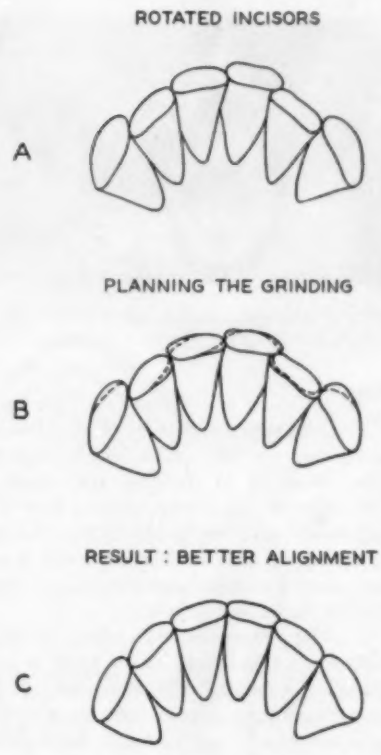


Fig. 11 • Grinding rotated teeth for better alignment: Beube. (Courtesy of Macmillan Company)

In a given position, such as protrusion, if only one tooth contacts, it carries 100 per cent of the load; if two teeth contact, each carries 50 per cent; if three teeth contact, each carries 33⅓ per cent; if four teeth contact, each carries 25 per cent; if five teeth contact, each carries 20 per cent; if six teeth contact, each carries 16⅔ per cent. Thus it can be determined with some accuracy, the amount of relief which can be given to a weakened tooth.

33. Miller, S. C., Textbook of periodontia, ed. 3. Philadelphia, Blakiston Co., 1950, p. 354.

Fig. 12 • Carbon marks before grinding

Fig. 13 • Carbon marks showing lingual bevel

3. Function is increased by beveling the lingual slopes of both upper and lower teeth and not the labial incisal angles. The effect is to increase the cutting efficiency of the lower incisors and to reduce the steepness of the incline planes of the upper incisors. The net result is to increase the number and efficiency of the cutting edges and planes.

4. The traumatogenic effect to the supporting tissues and to the teeth is reduced or prevented. This is accomplished by redistributing stresses over more teeth as described in 2 and 3; that is, increasing the cutting efficiency of incisal edges and reducing the steepness of lingual slopes of upper incisors, and by shortening them to reduce the leverage. Finally, the traumatic effect on teeth, such as chipping and fracturing, is prevented by beveling, disking and rounding of sharp corners.

Table 1 • Range of overbite before correction

Range in mm.	No. of patients
0—1.9	0
2—2.9	9
3—3.9	22
4—4.9	38
5—5.9	17
6—6.9	8
7 and over	6
	100

Median value is 4.4 mm.

5. To establish a condition of stability, if all of these conditions are met, subsequent grinding is unnecessary or required infrequently.

SUMMARY

A method of overbite adjustment has been developed and used for over ten years. It is based on recognized principles of occlusal equilibration by selective

Table 2 • Amount of reduction

Amt. in mm.	No. of patients
0.1	0
.2	1
.3	4
.4	9
.5	13 mode
.6	11
.7	9
.8	8 median
.9	7 mean
1.0	7
1.1	5
1.2	9
1.3	4
1.4	2
1.5	4
1.6	0
1.7	2
1.8	1
1.9	1
2.0	0
2.1	0
2.2	2
2.3	0
2.4	1
	100

grinding. Certain refinements apply particularly to the anterior segment of the dental arches. Overbite adjustment is indicated in the mature dentition where growth and development are inactive.

Occlusal equilibration by selective grinding should not be done indiscriminately, but only with a full knowledge of the possible benefits and the permanent damage which may result if done incorrectly. Tooth substance which is ground away is lost forever.

CONCLUSION

Adjustment of the overbite is indicated under the following circumstances:

1. Where orthodontic treatment is not contemplated or is contraindicated, and where treatment has been completed and the overbite is still extreme.
2. Where there is pathologic drifting, loosening or formation of diastemas.
3. Where periodontal disease is incipient or has already resulted in alveolar bone loss, periodontal pockets and tooth movement or loosening.
4. In establishing more favorable incisal relations before making dental restorations, partial, fixed or removable replacements.
5. For prevention and to improve esthetics and function.

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Recapturing esthetic tooth position in the edentulous patient

Earl Pound, D.D.S., Los Angeles

The purpose of this paper is to outline a technic used by the author to restore, in all three dimensions, original tooth positions and facial esthetics of edentulous patients. Brevity will not permit a review of the many generally unrecognized, far-reaching and functional advantages of this esthetic tooth positioning, but it will attempt to clarify why the esthetic principles employed can be rigidly adhered to regardless of the type of teeth used or the methods used to correlate them to one another and to the movements of the mandible.

If this natural replacement of teeth on dentures is approved however, it must be recognized that the resorbed ridges will not be used as a control for tooth position. The center of resorbed ridges does not represent the true position once occupied by the natural teeth, and it is not possible to judge accurately how far the ridges have resorbed in any given direction. Other guides must be used to aid in repositioning the teeth.

It is also felt that denture stability is not dependent on the placement of teeth over ridge centers. When teeth are replaced in their original positions, they are still within the physiologic limits of the denture base, and stability can be maintained if the base area is adequately

covered. The "tooth over the ridge" theory has many fallacies, which have been discussed in a former article.[1]

The technic used to recapture original tooth position in the absence of factual records involves three steps:

1. Development of a functional vertical dimension which will be as close to the patient's original vertical dimension as is practical.
2. Location of the original plane of occlusion within this dimension.
3. Restoration of natural tooth position on this plane.

In order to ascertain the most pleasing and practical dimension to use, three methods are employed, and the results are triple checked, one against the other. These methods are as follows:

1. Ascertainment of the original functional vertical dimension by facial measurements; the occlusal rims are set accordingly.
2. Independent determination of rest position to see if it checks correctly with the functional vertical dimension leaving sufficient freeway space.
3. Use of phonetic tests to check the accuracy and functional qualities of the preceding steps and to indicate necessary adjustments.

FUNCTIONAL VERTICAL DIMENSION

In regard to achievement of original functional vertical dimension, the method reported by McGee[2] in 1947 is used. In brief, Dr. McGee correlated the known functional vertical dimension with three facial measurements which remain constant through life. Although it is not possible to review all his work in this paper, a brief explanation of these measurements and how to utilize them follows:

Measurement 1 is the distance from the centered pupil of the eye downward to a line projected laterally from the junction of the lips in the median line (Fig. 1, above left).

Measurement 2 is the distance from the glabella, which is the most prominent bony point on the median line between the two eyebrows, to the subnasion, which is the angle between the septum and the surface of the upper lip (Fig. 1, above right).

Measurement 3 is from one corner of the mouth to the other. When this measurement is taken, a flexible ruler is used, and the lips are supported with occlusal rims. The ruler should make slight contact with the lower lip and follow the curve of the lips at their junction (Fig. 1, below left).

Measurement 4 is the functional vertical dimension. It is measured from the subnasion to the gnathion, which is the most anterior point in the median line of the lower border of the mandible. This point must be palpated and the soft tissues displaced to obtain a proper measurement (Fig. 1, below right).

According to McGee's research, invariably two of these first three measurements will be equal, and in some instances all three will equal one another. In 95 per cent of persons who had not lost their teeth, these two equal measurements, or the three equal ones, were the same as measurement 4, which is the known functional vertical dimension. By utilizing this information, it is possible, by taking these first three measurements on an edentulous patient, to find what the original functional vertical dimension was, since it will be the same as the two or three that match.

The first step in developing the occlusal rims is to determine this measurement and to adjust them to equal this amount. It is recognized, however, as brought out by Landa,[3] that errors are possible both

1. Pound, Earl. Lost—fine arts in the fallacy of the ridges. J. Pros. Den. 4:6 Jan. 1954.
2. McGee, G. F. Use of facial measurements in determining vertical dimension. J.A.D.A. 35:342 Sept. 1, 1947.
3. Landa, J. S. Free-way space and its significance in the rehabilitation of the masticatory apparatus. J. Pros. Den. 2:756 Nov. 1952.

Fig. 1 • Above left: Method used to measure distance from centered pupil of eye to a point level with junction of lips at median line. Above right: Measurement from glabella to subnasion is made by marking glabella and measuring as shown. Below left: Measurement of mouth with flexible ruler from corner to corner using lower lip at its junction with upper. Below right: Measurement of functional vertical dimension using pressure to locate gnathion

in the measuring of soft tissue and in a possible change in the consistency of soft tissue form, so an independent method of double checking this step seems advisable.

REST VERTICAL POSITION

To double check the accuracy of the preceding step, another calibration is made to determine the physiologic rest position of the mandible. This is done as an independent operation when the occlusal rims are being adjusted. The method used is the one advocated by Pleasure.[4]

At the beginning of this sitting, triangles of adhesive tape are placed on the nose and chin, and the patient is instructed to remain motionless any time the operator calibrates the distance between them (Fig. 2, left). This calibration is frequently repeated at times when the patient is in a relaxed or pensive mood until a consistent relaxed opening is obtained. This should indicate the proper position of the mandible at rest.

After the occlusal rims are adjusted to the predetermined original functional vertical dimension, the patient is asked to close, and one caliper point is placed at the apex of the upper tape. If the two recordings have been in harmony with original conditions, there will be a closure indicated as a lesser dimension on the lower tape. At this point, any closure from 2 to 6 mm. is acceptable (Fig. 2, center).

Other conditions, however, may prevail. There may be an excessive vertical decrease which would be recorded by a closure of more than 6 mm., or there may be less than 2 mm. of closure or an

4. Pleasure, M. A. Correct vertical dimension and freeway space. J.A.D.A. 43:160 Aug. 1951.

actual increase in vertical dimension (Fig. 2, right).

The dentist now has a double-checked, acceptable vertical dimension, or he is alerted to the fact that an abnormal condition exists which is caused either by an error in calculations or a disharmony existing between what appears to be a normal rest position and the original functional vertical dimension he has attempted to establish.

In the event disharmony exists, a thorough review of the calculations is made, and if errors are found they are corrected. If no errors are found, the dentist must then determine whether the patient has an acquired rest position, and if so, whether it can be restored to normal in whole or in part. Where this is not possible, the occlusal rims must be reduced sufficiently to allow for an adequate freeway space; this will decrease the original functional vertical dimension, which the dentist should strive to maintain because it is the one which will be most complimentary to the patient's appearance. However, dentures must be functional. To assure this, whether the measurements seem correct or not, another check is made, that of the function of facial expression and speech. This serves as a triple check to prove the accuracy and usability of what has been developed or to indicate the extent of any adjustments which may have to be made.

Successful phonetic tests depend on a patient's speaking in an effortless manner and being completely ignorant of the details about to be observed. The occlusal rims are fashioned on the lingual surface to allow for adequate tongue movement, and they are made secure in the mouth. Rather than using set phrases and words with known consonants, the patient is given something interesting to read which involves sounds and movements which the dentist wishes to study. The suggestion of Waugh[5] is most helpful. She uses

Fig. 2 • Left: Physiologic rest position of mandible is recorded on calipers as shown. Center: Occlusal rims are inserted and held in occlusion. Note decrease in vertical dimension indicating amount of freeway space. Right: Occlusal rims are too high; distance between tapes is greater than recorded physiologic rest position. This indicates error in facial measurements, or in calculating rest position, or both. If such an error cannot be found, it is assumed that patient has acquired a rest position which is closed more than it was originally; this is corrected or occlusal rims are adjusted to it

the following three selected verses from Kipling's poem "If":

If you can dream—and not make dreams your master:
If you can think—and not make thoughts your aim,
If you can meet with triumph and disaster
And treat those two imposters just the same:

If you can bear to hear the truth you've spoken
Twisted by knaves to make a trap for fools,
Or watch the things you gave your life to, broken,
And stoop and build 'em up with wornout tools:

If you can fill the unforgiving minute
With sixty seconds' worth of distance run,
Yours is the earth and everything that's in it,
And—which is more—you'll be a man, my son.

This poem is printed in large type on a card and is given the patient. He is asked to hold it high enough to keep the head erect and to read it through several times rather quickly and not to be concerned about articular difficulties.

At this point the dentist is interested in one thing, that is, the clearance which should exist between the edges of the occlusal rims when the letter S is being unconsciously repeated. It is common knowledge that in normal occlusions this clearance is between 1 and 2 mm. If this clearance does exist, in an instance in which the other two measurements checked satisfactorily, the dentist then has triple proof that the selected vertical dimension is both esthetic and functional.

If after a reasonable amount of checking, however, the occlusal rims are found to be too close together or too far apart, the original measurements should be reviewed. Too much space between the rims would definitely indicate an error which should be found and corrected. Insufficient space, if not found to be in error, is handled in the following manner:

First, conditioning of the patient, as suggested by Boos,[6] is instituted. Although he suggests this conditioning for other purposes, it serves equally well in this instance. He stated, "Sometimes a habit pattern is presented which is so strong that the various relations during phonetics and swallowing may follow in an incorrect pattern." This habit pattern is the thing which must be ruled out or accepted.

The patient is instructed in exercising at home as Dr. Boos suggests and is also given the occlusal rims with adhesive powder for insertion at home, and requested to spend a good deal of time reading aloud with them before the next appointment.

At the next appointment, the patient is studied again in the same manner to determine if there has been any improvement. This procedure sometimes has to be repeated, but eventually the occlusal rims prove to be satisfactory as they are, or a change in the vertical dimension becomes mandatory. If so, it is done cautiously until an acceptable functional clearance is developed. I have seldom found it necessary to change the vertical dimension more than a few millimeters; however, it is common to find that the final freeway space varies from 2 to 6 mm. Both Landa[3] and Ricketts[7] have found these same clearances to exist in the natural dentition.

THE OCCLUSAL PLANE

During this period in which the exact height of the occlusal rims was being decided, an occlusal plane was, of necessity, developed. This is a three dimensional or three level study, and the methods used to calculate just where these planes originally existed in this denture space are

5. Waugh, Dorothy B. Arrangement of teeth in the natural and artificial dentures. D. Cosmos 78:1125 Nov. 1936.

6. Boos, R. H. Occlusion from rest position. J. Pros. Den. 2:575 Sept. 1952.

7. Ricketts, R. M. Various conditions of the temporomandibular joint as revealed by cephalometric laminagraphy. Angle Orthodont. 22:98 April 1952.

based on a formula with three known and measurable natural controls.

First Control • The first of these measurable controls is the restoration of the functional vertical dimension which has just been outlined and established. This exact amount of denture space must be determined before the plane of occlusion can be positioned accurately. A level to this plane, of course, already has been established. This level must now be checked and possibly adjusted to fulfill the requirements of the two other controls which follow.

Second Control • The second factor of importance is the recapturing of the vertical level or the height which the occlusal plane is to occupy in this denture space. The logical control for this level should be some landmark located on the posterior mandibular surface, because as the mandible is moved and the vertical dimension is increased or decreased, the occlusal surfaces of the lower posterior teeth should remain in their natural juxtaposition with the rami, the cheeks and the tongue.

A great variety of unnatural occlusal levels can be made to exist in the molar region if the height of the occlusal plane is determined by using the upper lip and Camper's line or the Frankfort plane. When the vertical dimension is adjusted with these other technics, it is possible that the upper rim is so close to the lower residual ridge that insufficient room exists for the lower molars. The opposite is also found, in which the level of the lower molars is so high the tongue can hardly reach over them and insufficient room exists for the upper molars.

If the original natural level of the lower posterior occlusion can be restored, then, regardless of the vertical dimension, molar height variations can occur only with the upper molars. This can act as another guide to judging the accuracy of the vertical dimension, because either insufficient or exaggerated space for upper molars would again alert the dentist to the fact that this vertical dimension might be in error.

The mandibular landmark which was used as a control for this level is the lower border or apex of the retromolar pad. (This pad is a pear-shaped mass of loose tissue marking the distal termination of the mandibular residual ridge area.) A study of mandibular models in which both the natural teeth and the pad exist will reveal the fact that the lower apex of this pad is level with the posterior aspect of the occlusal plane of the lower teeth. It is fortunate that this pad maintains its basic position after the extraction of the mandibular teeth. It is usually discernible in the mouth and should be registered in an undistorted manner on edentulous models. When the pad is evident in the mouth, it automatically gives the height of the occlusal plane at its posterior position.

Third Control • Two controls have now been established: the exact distance between the alveolar ridges and a point between them marking the vertical level of the occlusal plane at its posterior aspect. The original horizontal and anteroposterior levels must next be found.

When forming the occlusal rims, in those instances where no former records are available, the usual anterior landmarks, namely, the interpupillary level, and the lower border of the upper lip, are used. There are, however, two serious complications to this technic. The first is that a surprising number of people have one eye much higher or lower than the other, and their occlusal planes are not parallel horizontally with these malpositioned eyes. Secondly, many people show a great deal more of their central incisors than is considered normal and some show considerably less. These patients look extremely unnatural with teeth set in the orthodox manner anteriorly. The experienced operator can sometimes recognize

this, but the "denture smiles" that often are apparent indicate that many mistakes are made.

To offset the complication of an unnatural placement of the anterior teeth in relation to the upper lip and to assure a naturally esthetic occlusal level, I have used a method brought to my attention about nine years ago.[8] It is based on the theory that the natural plane of occlusion, both horizontally and anteroposteriorly, is parallel to the floor when the head is resting on the body in a neuromuscular balance. It is not difficult to determine when the head is relaxed, sitting evenly upon the shoulders, and being carried at right angles to the erect postural line, and it is easy to check the level of the plane of occlusion established with the head in this position. It is also simple and informative to study the level of this plane in persons who have teeth, because so many persons show as far back as their molars in laughing and talking, and it is surprisingly easy to note when the head is in balance and to see the parallelism that exists between the general plane of occlusion and the floor.

At this point, however, the occlusal rims have been adjusted with these three following controls in mind:

1. The original vertical dimension has been re-established as nearly as possible.
2. The base of the retromolar pad was used as a control for the vertical height of the occlusal plane.
3. The anteroposterior and horizontal levels were adjusted with the assumption that the patient had a normal tooth display, so the rims were set to the lower border of the upper lip and the interpupillary level.

As has been stated, these are all measurable and natural esthetic conditions which exist in normal persons with a normal tooth display. If it is also natural for the occlusal plane to be parallel to the floor under the conditions outlined, then if the patient did have a normal tooth display, this parallelism should now exist and should be demonstrable.

The occlusal rims are inserted, and the patient is asked to stand and be relaxed. He is engaged in conversation and his mind diverted from the dental problem with an aim toward catching him with his posture erect and his head relaxed upon his shoulders. When this is achieved, his head is grasped quickly, and he is asked to hold steady, and a thin, rigid piece of metal, about eight inches long, is inserted between the rims to check the horizontal level. This metal piece should be parallel to the interpupillary level used, and it should also be parallel to the floor. If it is not, a study of the face will reveal that the eyes are not set in the skull on a level with one another, and notations are made for adjusting the rims so they will be at right angles to the postural level, or parallel to the floor.

The next step is to place the metal piece or the thin blade of a cement spatula between the rims so that it protrudes anteriorly (Fig. 3). It is now very easy to see if it is parallel to the floor or not. In three out of four instances the protruding metal will be parallel, which would indicate that these patients undoubtedly had a normal display of anterior teeth. Whenever parallelism is not clearly demonstrated, the test is repeated several times to be sure that an error has not been made in judging head position, but if the protruding metal continues to indicate either a downward or an upward inclination, it is assumed then that the patient had an unusual tooth display, and corrections are made.

When the inclination of the metal is upward, material must be added to the anterior portion of the upper occlusal rim and subtracted from the lower until parallelism is obtained. This will result

8. Kovats, J. E. Personal instruction.

Fig. 3 • Thin-bladed cement spatula between occlusal rims will indicate degree of parallelism to floor

in an increased display of wax and later of teeth below the border of the upper lip. If the inclination is downward, material must be subtracted from the upper occlusal rim and added to the lower, thereby resulting in reduced display of the upper wax. It is important when making these adjustments that the wax be removed in a wedge shape and that none is removed from the posterior part of the occlusal rims. In this way, the vertical dimension will not be changed.

It might be pointed out here that when the retromolar pad is used as a control for the height of the occlusal rim, if an overclosure is developed and the plane kept parallel to the floor, the anterior tooth display will not be sufficient. If the opposite is developed, too much of the anterior teeth will show. This is another reason why the dentist should be most careful to restore the original vertical dimension.

TOOTH PLACEMENT

The next step is placing the teeth upon this plane. They are selected according to the fundamental classification of natural teeth, as outlined by House and Loop.[9] Their principles are rigidly adhered to and result in having teeth harmonious in size and shape with the arches and the edentulous space.

My technic is to make this basic selection and then roughly to set up the six anterior teeth in accordance with the lip support judged adequate by the occlusal rims. Their vertical level has been determined, and they are centered on either side and anterior to the incisive pad, which is usually well defined and undistorted. The dentist now adds to this, setting the upper bicuspids and molars in the buccolingual position where they are likely to belong because they definitely are an aid in judging the position of the anterior teeth.

At this time the patient is seen and corrections are made. It is borne in mind that the major decisions are pitch, or tooth inclination, and the distance anterior to the resorbed ridge these teeth should be set.

The position of the anterior teeth is now rechecked in three ways. The first is one seldom considered: it is to ascertain if the position chosen is in harmony with surrounding structures so that natural labial and lingual contours can be developed about them. Students of dental arch anatomy can quickly recognize unnatural contours about teeth set too far lingually or labially. If the chosen tooth position does not permit this natural contouring, the teeth are shifted forward or backward until they are in a more harmonious anatomical position.

The second check is to determine if this setting is in harmony with the lower lip during speech. When V and F sounds are used, the incisal edges of the upper anterior teeth should seal lightly against the distal aspect of the lower lip from cuspid to cuspid. For this test the poem previously mentioned is used again, and

9. House, M. M., and Loop, J. L. Form and color harmony in the dental art. Privately printed, 1939.

the patient is influenced to read it in different ways and to talk and laugh. This produces many natural facial functions and simultaneously permits the third check; namely, that of again studying lip support, tooth inclination and so forth. At this time, or later when the lower teeth are also in position, assorted shades, molds and various irregular settings of the individual teeth are tried, to lend effects which are more natural than those usually rendered by routine setups.

The next consideration is the setting of the lower anterior teeth. Their basic position is controlled by the original type of occlusion. Observation of jaw relations and the facial measurements, as suggested by McGee,[2] will indicate whether they are to be set to a normal, an edge-to-edge, or a retruded position. They are placed as indicated, and a careful study of their esthetic and phonetic position in function is made.

The poem again is brought into use and the proper clearance for the letter S is developed carefully. In some instances of retruded position, the lower anterior teeth do not come as far forward as is normal, and in these instances about 1 mm. of clearance is watched for in the region of the lower bicuspid. Again the seal on the lower lip during the F and V sounds is checked, and certainty of adequate clearance between the incisal edges of the upper and lower teeth for the tip of the tongue when the TH sounds are being used is made. This is an explosive sound in which the tongue seals all the space between the teeth from molar to molar, and as it releases, the TH sounds found in "this" and "that" are made. For this purpose the amount of space between these incisal edges should be about 3 to 4 mm.

When the dentist is satisfied with the setting of these teeth, the patient may be dismissed, because the natural placement of the remaining posterior teeth is easily established, since all the dentist has to determine is their natural buccolingual position between the tongue and the cheek. The residual ridges are not constant and cannot be used as a control for this position, so the dentist capitalizes on the following observation to give a natural setting regardless of the condition or position of the ridges.

A study of the natural dentition reveals that the lingual surfaces of the lower posterior teeth always lie between two slightly divergent lines, both of which start from the mesial aspect of the lower cuspid and continue backward, one to the lingual aspect of the retromolar pad and the other to its buccal aspect (Fig. 4, left). These surfaces always occupy this basic position regardless of the type of occlusion, it being a functional setting created by the reciprocal pressures of the tongue and cheek muscles during the formative period.

Positioning these lower posterior teeth is the controlling factor in the buccolingual setting of the upper posterior teeth which may have to be slightly readjusted at this time. Such positioning will result in these upper teeth's being placed on the buccal aspect of the upper ridge where they still have solid bony support beneath them. On the other hand, because of the fact that the lower ridge centers move buccally as resorption progresses, it is not unusual to find the lower posterior teeth directly over their resorbed ridge.

This principle is practiced by marking these two lines posteriorly from the cuspid on the lower wax rim (Fig. 4, right) and then setting the remaining posterior lower teeth so that their lingual surfaces are just slightly buccal to the most lingual line. The upper posterior teeth are then articulated with them and the occlusion balanced.

Occasionally it is found that on one side or both, the upper posterior teeth have to be set so far buccally that they are almost over the periphery. This is unnatural of course and would indicate that something is wrong. In no instance

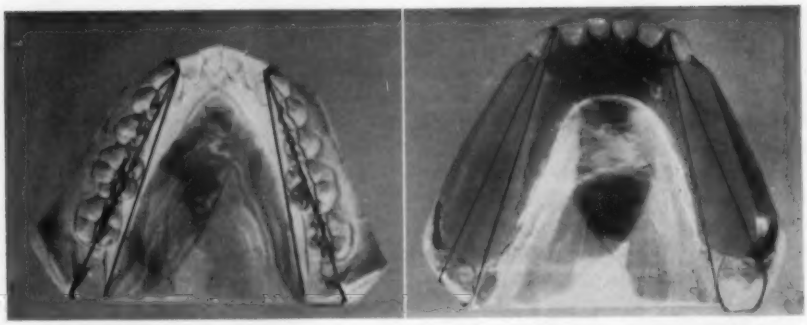

Fig. 4 • Left: Model shows relation of lingual surface of lower posterior teeth to lines projected from buccal and lingual aspects of retromolar pad to mesial aspect of cuspid. Right: Control established for buccolingual position of posterior teeth by marking the two lines on occlusal rim

should the lower teeth be moved more lingually to aid in repositioning these upper teeth. Such instances were definitely cross-bites originally; the procedure is to set the upper teeth more lingually into a cross-bite relation.

The teeth now have been positioned so that anteriorly and posteriorly they are in functional and esthetic harmony with the muscles of expression, mastication and deglutition. The other factor of importance necessary to complement the functional values of dentures with teeth so positioned is that the natural contours of the dental arches must be fashioned about them. This has been reviewed in a former article[10] and is most important in permitting a smooth functioning of the facial and oral musculature (Fig. 5).

SUMMARY

A method is outlined for first recapturing, then adjusting to denture function, the

10. Pound, Earl. Esthetic dentures and their phonetic values. J. Pros. Den. 1:98 Jan.-March 1951.

Fig. 5 • Views of dentures show normal contours of supporting structures of naturally positioned teeth. Note how interseptal tissues approach teeth and are angled to permit easy shedding of bolus of food from around teeth and how buccal muscles are supported to aid further in food manipulation

original vertical dimension, occlusal plane and tooth position in edentulous patients. The technic used involves development of a functional vertical dimension as close to the original as possible, location of the original plane of occlusion within this dimension and restoration of natural tooth position on this plane. The results are functional and esthetic.

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A comparison of pH values of in vivo dental plaque after sucrose and sorbitol mouth rinses

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It is felt by many investigators[1-3] that dental caries is initiated and continued by the production of acid in the dentobacterial plaque during a short period after the ingestion of fermentable carbohydrates. If a nonfermentable sweet substance could be substituted for sucrose or other fermentable carbohydrates, significant reductions in the incidence of dental caries might be attained. Such a possibility exists with the substitution of the hexahydroxy alcohol, sorbitol for sucrose and dextrose in various confections.

Sorbitol occurs naturally in many fruits and may be synthetically produced by the catalytic reduction of glucose. Although sorbitol is considered an alcohol and not a sugar because it does not contain a characteristic aldehyde or ketone configuration, it is a food and, as such, can be converted into liver glycogen and into glucose.[4] Sorbitol is utilized at a much slower rate after ingestion than glucose; however, chiefly because of its delayed intestinal absorption, its total oxidation approaches that of glucose over a 24 hour period.

There is strong *in vitro* evidence that sorbitol is not readily fermented by acidogenic mouth organisms. Grubb[5] demonstrated that sorbitol was fermented more slowly than sucrose and dextrose by various strains of *Lactobacillus acidophilus*, oral streptococci, yeasts, and mixtures of yeasts and *L. acidophilus* in various media. It was believed that sorbitol is oxidized to sorbose and Grubb demon-

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1. Stephan, R. M. Intra-oral hydrogen-ion concentrations associated with dental caries activity. J.D. Res. 23:257 Aug. 1944.

2. Strallors, A. Studies of microbiology of caries. II. Acid fermentation in dental plaques in situ compared with lactobacillus counts. J.D. Res. 27:576 Oct. 1948.

3. Moore, B. W., and others. Formation of lactic acid in dental plaques. I. Caries-active individuals. J.D Res. 35:778 Oct. 1956.

4. Wick, A. N.; Almen, M. C., and Joseph, L. Metabolism of sorbitol. J.Am.Pharm. A. (Scient. ed.) 40:542 Nov. 1951.

5. Grubb, T. C. Studies on fermentation of sorbitol by oral microorganisms. J.D. Res. 24:31 Feb. 1945.

Table 1 • Distribution of 31 caries active individuals according to minimum pH values attained during the 20 minute period after a sucrose mouth rinse

pH	Upper right quadrant		Lower right quadrant		Lower left quadrant		Upper left quadrant	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
<5.3	2	6.5	1	3.2	5	16.1	4	12.9
5.4—5.6	11	35.5	12	38.7	7	22.6	16	51.6
5.7—5.9	7	22.6	8	25.8	12	38.7	6	19.4
>6.0	11	35.5	10	32.3	7	22.6	5	16.1
Total	31	100	31	100	31	100	31	100

100 per cent of pH values after sorbitol rinses were > 6.0 in all quadrants.

strated that bacterial enzymes find it difficult to cause the further decomposition of sorbose.

Crowley, Harner, Bennett and Jay[6] compared the *in vitro* fermentability of sorbitol, glycerol and glucose by certain oral microorganisms (lactobacilli, streptococci, staphylococci and yeast). Within 24 hours, the vast majority of the common oral microorganisms tested produced sufficient acid from glucose to decalcify enamel; however, this was not true of sorbitol. After one week the mean pH of sorbitol-lactobacilli cultures was 5.1, but it was concluded that sorbitol was not likely to be retained in the mouth for so long a time.

Shockley, Randles and Dodd[7] demonstrated that the mixed flora of saliva had little tendency to ferment sorbitol during short periods of incubation *in vitro*.

It was the purpose of this study to complement the previous *in vitro* studies with *in vivo* determinations of acid potentials produced in the dental plaque by sorbitol and sucrose rinses.

METHOD

Caries active individuals (naval recruits), average age 18 years, were screened for this study. Dental plaque pH determinations were made with a Coleman vacuum tube potentiometer[8] before and at 5, 10, 15 and 20 minute intervals after a one minute 50 per cent sucrose mouth rinse. At each time interval, four plaque pH determinations were made, one from each posterior quadrant. Plaque was considered any substance normally found around the teeth regardless of its origin. This included materia alba and other debris, but not food, calculus or decay. Sufficient plaque to cover the head of a discoid instrument was removed from the buccoproximal surfaces of the molars and, whenever possible, was taken from the same tooth in each posterior quadrant at each time interval throughout the study. Over 100 individuals were screened but only 31 produced an acid potential of pH 5.6 or below at some time during the 20 minute interval and these were selected for study.

Each individual was instructed to return at approximately the same time the following day. Similar pH determinations after a 50 per cent sorbitol rinse were then taken. Approximately one hour later, a sucrose mouth rinse was again given and pH values were determined.

RESULTS

Table 1 shows the distribution of the 31 individuals tested, according to the mini-

6. Crowley, M. C., and others. Comparative fermentability of sorbitol, glucose and glycerol by common oral microorganisms. J.A.D.A. 52:148 Feb. 1956.

7. Shockley, T. E.; Randles, C. I., and Dodd, M. C. Fermentation of sorbitol by certain acidogenic oral microorganisms. J.D. Res. 35:233 April 1956.

8. Fosdick, L. S.; Campaigne, E. E., and Fancher, O. Rate of acid formation in carious areas: etiology of dental caries. Illinois D.J. 10:85 March 1941.

Table 2 • Comparison of average minimum pH values, by quadrants, during the 20 minute interval after sucrose and sorbitol mouth rinses in 31 caries-active individuals

Quadrant	Average minimum pH values	
	Sucrose	Sorbitol
Upper right	5.77	6.64
Lower right	5.79	6.72
Lower left	5.66	6.72
Upper left	5.60	6.70

Note: The over-all average minimum pH values, without reference to the quadrant breakdown of the individual readings, after sucrose was 5.38 and after sorbitol was 6.55.

mum pH values attained for each quadrant after the sucrose mouth rinse. In each quadrant, the percentage of individuals falling into various pH ranges is noted. Most subjects, after sucrose rinses, consistently produced pH values below 6.0 in several quadrants. All individuals produced an acid potential of pH 5.6 or below at least once after sucrose, and many produced high acidities in several quadrants. Values below pH 6.0 were never reached after sorbitol.

Table 2 reveals the average minimum pH values of the 31 individuals subsequent to the sucrose and sorbitol mouth rinses. This table shows the average minimum pH values by quadrants and the over-all average minimum pH values for the 31 individuals without reference to the quadrant breakdown of the individual pH readings. The average minimum pH for each quadrant was calculated from the raw data by selecting the lowest pH reading occurring for each individual in a given quadrant at any time during the 20 minute period after the rinses; the mean of the 31 readings was then calculated. The over-all average minimum pH values were similarly determined, but differed only in that the lowest pH reading occurring for each individual in any quadrant was selected. The over-all average minimum pH value after sucrose was 5.38 and after sorbitol was 6.55.

The mean pH readings for each quadrant in 31 individuals at each time interval for both sucrose and sorbitol are shown in Tables 3 and 4. These pH readings were rounded to the nearest tenth and plotted (see illustration). It should be noted that these average values are much higher than the average minimum pH values because the minimum pH values did not occur at the same time intervals and the frequency of low pH readings varied with each individual. Hence, the higher individual pH readings would tend to elevate the average pH readings at each time interval.

At each time interval, plaque was removed from each quadrant in the following order: upper right quadrant, lower right quadrant, lower left quadrant, and upper left quadrant. The illustration shows that the average pH readings for each quadrant were initially at pH 6.6 before the one minute 50 per cent sucrose mouth rinse. The most extreme reductions in pH after sucrose occurred somewhere between 5 and 10 minutes. The most precipitous reduction in pH occurred in the upper left quadrant (pH 5.7). Most likely, if all the pH determinations between the 5 and 10 minute interval could have been determined simultaneously, the pH drop would have been equal in each quadrant. Upper right, lower right and lower left quadrants probably dropped to the same level as

Table 3 • Average pH readings by quadrants (31 individuals) before and during the 20 minute interval after a 1 minute 50 per cent sucrose mouth rinse

Quadrant	Mean time after 1 minute rinse with sucrose 50 per cent				
	0	5	10	15	20
Av. pH upper right	6.61	6.15	5.97	6.06	6.19
Av. pH lower right	6.64	5.91	6.03	6.09	6.21
Av. pH lower left	6.62	5.82	5.93	6.07	6.23
Av. pH upper left	6.64	5.73	5.84	6.07	6.12
Total	6.63	5.90	5.94	6.07	6.19

Table 4 • Average pH readings by quadrants (31 individuals) before and during the 20 minute interval after a 1 minute 50 per cent sorbitol mouth rinse

Quadrant	Mean time after 1 minute rinse with sorbitol 50 per cent				
	0	5	10	15	20
Av. pH upper right	6.76	6.89	6.87	6.87	6.88
Av. pH lower right	6.71	6.86	6.88	6.87	6.97
Av. pH lower left	6.64	6.85	6.90	6.90	6.89
Av. pH upper left	6.77	6.92	6.85	6.87	6.86
Total	6.72	6.88	6.88	6.88	6.90

the upper left, but this could not be detected because, at subsequent time intervals, upper right, lower right, and lower left quadrant had already passed through the stage of greatest acidity and started to approach the initial pH reading. For purposes of simplicity, pH readings for each time interval were plotted as occurring at 5, 10, 15 and 20 minutes. At the 20 minute interval after the sucrose rinse, none of the quadrants exhibited pH values greater than 6.2 and therefore did not approach the initial readings of 6.6.

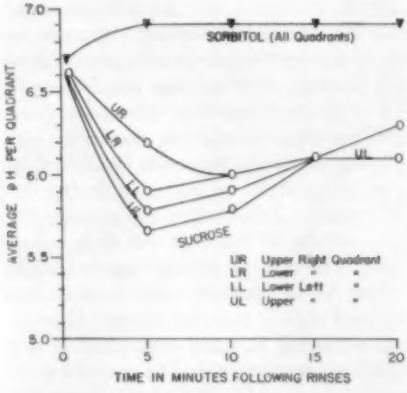
Plots of the average pH readings at each time interval after sorbitol showed that although there was a slight variation in the average plaque pH readings before the sorbitol rinse by quadrants (approximately 0.2 pH units), the average pH readings for each postrinse time interval in each quadrant increased to 6.9 and were maintained at that level for 20 minutes.

Twenty of the 31 caries active individuals were again given a one minute 50 per cent sucrose mouth rinse at approximately one hour after the sorbitol mouth rinse. All produced considerable amounts of acid with pH readings considerably lower than those after sorbitol rinses. Eighteen of these 20 individuals dropped to below pH 6.0 at some time during the 20 minute interval after the sucrose mouth rinse.

DISCUSSION

There was a minor variation in the day to day prerinse mean plaque pH values (Tables 3 and 4). This can be accounted for by the method of pH measurement and clearly demonstrates that the variation of mean plaque acidities from quadrant to quadrant and from corresponding quadrant to quadrant on successive days is slight. This consistency of results in mean plaque sampling before sucrose and sorbitol rinses in the same individuals indicates the reliability of the testing methods.

A comparison of pH determinations after sucrose and sorbitol mouth rinses in 31 individuals demonstrates clearly that sorbitol is not metabolized to acid by dental plaque during the 20 minute period. Indeed, sorbitol produced a consistent elevation of plaque pH over initial readings. The same 31 individuals produced acidities sufficient to decalcify the hard substance of the teeth after the sucrose rinse, and all produced an acid potential of at least pH 5.6 at some time during the 20 minute interval. The average minimum pH (all quadrants combined) after



Comparison of average pH readings for each quadrant at five minute intervals after a 50 per cent sucrose and sorbitol mouth rinse in 31 caries-active individuals

the sucrose rinse was 5.38 and for sorbitol was 6.6.

pH values were determined for the sucrose and sorbitol solutions. The pH of the sorbitol solution was 5.5 and for sucrose, 6.6. It seems doubtful, therefore, that the differences in action by the dental plaque on sucrose and sorbitol could be accounted for by the pH of the sorbitol and sucrose solutions *per se* but must be due to the metabolism of the microorganisms in the dental plaque.

To substantiate the fact that the 31 individuals selected were consistent acid producers, 20 were given an additional sucrose mouth rinse at approximately one hour after the sorbitol rinse. All produced greater acidities than with sorbitol and 18 of the 20 dropped below pH 6.0. However, the drops were not as severe as after the initial sucrose rinses, and it seems that residual sorbitol in the plaque may have had some effect in preventing a greater drop in pH levels.

This study bears out the *in vitro* studies of Grubb, Crowley and co-workers and Shockley and associates and provides further evidence that the *in vitro* study of acid production by oral microflorae gives an excellent indication of the actual carbohydrate metabolism in the dental plaque.

Although cyclamate and saccharin are effective sweetening agents and can be used as sugar substitutes, they are not foods and do not have any nutritional value. However, in the rat, sorbitol approaches glucose in caloric value.[4] It has been reported that sorbitol has cathartic properties in quantities over 50 Gm.[5] This action is probably due to its delayed absorption in the intestine and is based on the osmotic transfer of water into the bowel. Although sorbitol cannot replace sugar completely in the normal diet, it may be used effectively in confections, in limited amounts, in certain persons with rampant caries.

SUMMARY

1. Plaque pH determinations were made after sucrose and sorbitol mouth rinses.

2. Slight variation was noted when the average pH readings for each quadrant were compared before sucrose and sorbitol mouth rinses.

3. The average minimum pH (all quadrants combined) during the 20 minute interval after a one minute 50 per cent sucrose mouth rinse was pH 5.38 and after sorbitol was 6.55.

4. All individuals produced an acid potential of at least pH 5.6 at some time during the 20 minute interval after the sucrose rinse. None of these individuals produced pH values below pH 6.0 at any time after sorbitol mouth rinses.

5. For each quadrant, the average pH value during the 20 minute period after a one minute 50 per cent sorbitol mouth rinse was 6.9. The average pH value for each quadrant during the 20 minute period after a sucrose rinse dropped precipitously.

6. If acid production in the dental plaque after ingestion of fermentable carbohydrate is responsible for the initiation of caries, the inclusion of sorbitol in moderate amounts in diets for individuals with rampant caries seems rational.

Effect of a dentifrice containing stannous fluoride on dental caries in adults. II. Results at the end of two years of unsupervised use

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Previous attempts to use preventive agents to reduce the dental caries experience in adults were reviewed in a report[1] of an earlier portion of this study. That report also indicated that a stannous fluoride dentifrice in which the abrasive was calcium pyrophosphate effectively reduced the dental caries experience in adults. This finding is in agreement with results from an earlier study showing a similar reduction when the same dentifrice was used by children.[2,3]

The purpose of this paper is to report data which have been obtained after two years of continuous use of a stannous fluoride dentifrice by young adult college students. The present observations are of particular interest since they indicate the possibility that through the use of this type of dentifrice prolonged benefits of topical fluoride therapy may be extended to that portion of the adult population that did not receive the benefits of fluoride in the drinking water while their permanent teeth were calcifying.

EXPERIMENTAL PROCEDURE

A detailed description of the method employed in conducting this study has been reported.[1] Four hundred and twenty-five students from the 1953 freshman class at Indiana University whose ages ranged from 17 to 36 years were given a dental prophylaxis followed by a thorough clinical examination with the aid of complete bitewing roentgenograms. The subjects were then divided into two groups at random after stratification according to previous caries experience. The two groups of young adults were provided with dentifrices which were identical except that one contained 4,000 ppm stannous fluoride. The composition of the dentifrice was identical to that reported previously.[3] Each student reported to the clinic at 6, 12 and 24 months after his initial visit for prophylaxis followed by clinical and roentgenographic examination. The results after 6 and 12 months have been reported.[1]

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†Procter & Gamble Company.

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2. Muhler, J. C., and others. Effect of a stannous fluoride-containing dentifrice on caries reduction in children. J. D. Res. 33:606 Oct. 1954.

3. Muhler, J. C., and others. Effect of a stannous fluoride-containing dentifrice on dental caries reduction in children. II. Caries experience after one year. J.A.D.A. 50:163 Feb. 1955.

Table 1 • Distribution by age of subjects who completed the two year test

Age	Number of subjects	
	Control	SnF_2
18	22	25
19	77	73
20	6	11
21	1	6
22	2	4
23	3	4
24	4	4
25	—	2
26	—	2
27	1	—
Total	116	131

DATA AND DISCUSSION

After a two year period of participation in the dental caries study program, 247 adults were available for re-examination. The age distribution of the subjects completing the test is given in Table 1.

The results, in terms of caries increments, are presented in Table 2. The latter tabulation shows the results of the study in terms of new DMF teeth, new DMF surfaces, and in the components of new DMF surfaces by surface type. The results indicate a reduction in dental caries rate of approximately 30 per cent by all the indices used.

The best over-all estimate of the effectiveness of the stannous fluoride dentifrice is shown in the column in Table 2 labeled "new DMF surfaces." Through the use of this index, a statistically significant reduction of 34 per cent was found in the caries rate. Although this result is not greatly different from that obtained at the end of the first year (42 per cent reduction in DMF surfaces), there is a possibility that the dentifrice decreased in effectiveness on prolonged storage. Because of this possibility, an improved stannous fluoride dentifrice currently is being tested. This dentifrice appears to have a prolonged life and increased anticaries activity, as judged by laboratory tests.

Since the greatest number of subjects were in the 18 and 19 year old age groups (Table 1), it was of interest to determine the effectiveness of the stannous fluoride dentifrice in only these groups. Such a comparison, using the "new DMF surfaces" index, showed a mean caries increment of 5.04 in the control group and

Table 2 • Average increase in dental caries experience in young adults using a stannous fluoride and control dentifrice for a two year period

	New DMF teeth	New DMF surfaces	New DMF surfaces proximal	New DMF surfaces occlusal	New DMF surfaces buccal-lingual
Group 1 116 subjects control dentifrice	1.52	4.99	2.77	1.50	0.72
Group 2 131 subjects SnF_2 dentifrice	1.06	3.31	1.81	0.96	0.54
% reduction in caries rate	30	34	35	36	25
Probability	<0.06	<0.005	<0.007	<0.025	~ 0.3

Table 3 • Summary of clinical caries tests of dentifrices containing fluoride

Dentifrice combination		Clinical results*	References
Fluoride	Abrasive		
NaF	Calcium carbonate	(−), (−)	5, 6
NaF	Dicalcium phosphate	(−)	7
NaF	Calcium pyrophosphate	(−)	4
SnF_2	Dicalcium phosphate	(−)	8
SnF_2	Calcium pyrophosphate	(+), (+), (+), (+)	1–4

*(−) indicates that no statistically significant protection against caries was observed. (+) indicates that a statistically significant protection against caries was observed.

3.70 in the stannous fluoride group, or a reduction of 27 per cent. This result is consistent with the effect produced by using the entire group for comparative purpose.

Clinical evidence for the anticariogenic effectiveness of a specific dentifrice formulation containing stannous fluoride and calcium pyrophosphate has been presented in this and in four previous reports.[1-4] In contrast, five separate studies indicate the lack of effectiveness for dentifrices containing a combination of fluoride and abrasive other than stannous fluoride and calcium pyrophosphate.

In 1945 Bibby[5] reported no reduction in dental caries among children using a dentifrice containing sodium fluoride and calcium carbonate. Again in 1953 a similar dentifrice was shown by Winkler and co-workers[6] to have no anticariogenic effect among boys 11 to 15 years of age. Another clinical study was later reported by Bibby and Brudevold[7] which showed no reduction among children who used a dentifrice containing sodium fluoride and the conventional dentifrice abrasive, dicalcium phosphate. A fourth study[4] indicated that a sodium fluoride dentifrice was ineffective even though it contained calcium pyrophosphate. The fifth study[8] indicated that a dentifrice containing stannous fluoride was ineffective when the abrasive was dicalcium phosphate, the most commonly used dentifrice abrasive. These studies as a group are summarized in Table 3.

Thus it is seen that a stannous fluoride dentifrice containing calcium pyrophosphate is the only combination of fluoride and abrasive yet tested whose ability to reduce the incidence of dental caries clinically in human beings has been reported.

CONCLUSIONS

After two years of unsupervised use of a dentifrice containing stannous fluoride as the active anticariogenic ingredient and calcium pyrophosphate as the abrasive, a statistically significant reduction in the incidence of dental caries in adults has been observed.

4. Muhler, J. C., and others. Comparison between the anticariogenic effects of dentifrices containing stannous fluoride and sodium fluoride. J.A.D.A. 51:556 Nov. 1955.

5. Bibby, B. G. Test of the effect of fluoride-containing dentifrice on dental caries. J. D. Res. 24:297 Dec. 1945.

6. Winkler, K. C.; Dirks, O. B., and van Amerongen, J. Reproducible method for caries evaluation. Test in a therapeutic experiment with a fluorinated dentifrice. Brit. D. J. 95:119 Sept. 15, 1953.

7. Bibby, B. G., and Brudevold, F. External action of fluorides and other agents on the teeth in the prevention of dental decay. Fluoridation as a public health measure, James H. Shaw, editor. Washington, D. C., American Association for the Advancement of Science, 1954, p. 158, 159.

8. Muhler, J. C. Effect on dental caries of a dentifrice containing stannous fluoride and dicalcium phosphate. Unpublished data.

Lack of effect of exposure to radiation during intraoral roentgenographic examination as evidenced by postexamination blood studies

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Studies directed at evaluating radiation hazards to the patient and operator during intraoral roentgenographic procedures suggest that the problem is of considerable concern.[1-3]

Nolan and Patterson[4-5] have quite properly noted that there is a concentration of lymphatic tissue in the region of the neck. They have further suggested that since this tissue is exceedingly sensitive to radiation, changes in the blood picture of patients undergoing intraoral roentgenographic examinations might possibly be expected with high radiation dose rates. According to Nolan and Patterson,[4] ten of their patients who had received full-mouth roentgenographic examinations in their laboratory were exposed to the following amounts of radiation respectively: 35 r, 115 r, 135 r, 65 r, 315 r, 315 r, 285 r, 282 r, 285 r, and 280 r. In order to study the hematologic changes resulting therefrom, Nolan and Patterson observed these ten patients in the following manner: a total white blood count and differential counts were performed every hour beginning at 8 A.M. and running in some instances until 10 P.M. two to three days before exposure to a full-mouth roentgenographic examination. This procedure was to allow observation of the normal, diurnal variation of the particular patient. On the day of examination, the same procedure was followed.

The patient was observed daily after the first day for several days and weekly for several weeks. In all instances except one, a significant change in the blood picture was observed to a greater or lesser degree after exposure to radiation depending on the dose delivered.[4] With the exception of the patient who received only 35 r, all others showed an apparent depression in lymphocytes. (The internationally accepted unit of roentgen-ray

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1. Jacobson, L., and Sheppard, I. M. X-ray hazards and protection in dental radiography. New York D.J. 18:367 Oct. 1952.

2. Russell, L. B., and Russell, W. L. Radiation hazards to embryo and fetus. Radiology 58:369 March 1952.

3. Budowsky, J., and Kutscher, A. H. Exposure to x-radiation during the general practice of dentistry. New York D.J. 19:298 June-July 1953.

4. Nolan, W. E. Radiation hazards to the patient from oral roentgenography. J.A.D.A. 47:681 Dec. 1953.

5. Nolan, W. E., and Patterson, H. W. Radiation hazards from the use of dental x-ray units. Berkeley, Calif., University of California Radiation Laboratory, revised, November 26, 1952.

Table 1 • Hospital observations in the ten volunteer adult patients studied

Sex	Age	Reason for hospitalization	Hospital findings	Prognosis
M	65	Survey	Acute and chronic prostatitis, benign prostatic hypertrophy	Good
M	71	Survey	Carcinoma prostate, epididymitis	Good
M	51	Survey	Carcinoma prostate	Good
M	58	Survey	Benign prostatitic hypertrophy, alcoholism	Good
M	60	Survey	Carcinoma prostate	Good
M	33	Survey	Nephrolithiasis, pyelonephritis	Good
M	63	Survey	Benign prostatic hypertrophy; incontinence	Good
M	76	Referred by local physician	Adrenocarcinoma of prostate and bladder	Fair
M	64	Survey	Benign prostatic hypertrophy, pyelonephritis	Good
M	52	Survey	Adrenocarcinoma prostate	Good

quantity is 35 r.[6, 7]) This depression in lymphocytes was noted as early as the seventh hour after the roentgenographic examination, but in some instances it did not occur until 12 hours afterward. The lymphocyte count remained depressed for a period varying from 2 hours to 30 hours. In one instance, when the patient received 315 r, the depression seemed to be close to 45 per cent. Other unspecified hematologic changes were also observed. Nolan and Patterson concluded that "it can be said that significant blood changes have been observed in patients exposed to full mouth roentgenographic examination to a greater or lesser degree, depending on the total exposure."

In our efforts to investigate the exposure of dental patients to radiation based on the roentgen-ray dosage administered to various areas of the skin of the face during full-mouth series of 14 periapical roentgenograms (determined directly using a Victoreen ionization chamber in the course of 40 full-mouth series of roentgenograms taken of 40 adult subjects), our radiation exposure findings ranged only from 46.0 to 76.9 r.[8]

These findings were in contrast to those of Nolan and Patterson, although it should be noted that our full-mouth series comprised the usual 14 films, whereas Nolan and Patterson described the use of as many as 25 to 30 films in their unusually and perhaps overly extensive full-mouth series. The present study was performed to study further the extent to which the blood picture alluded to by Nolan and Patterson might be altered in the course of routine full-mouth series of 14 intraoral roentgenograms.

METHODS

Hematologic studies were performed on ten male volunteer hospital patients, aged 33 to 76, (Table 1) with normal, peripheral blood counts, receiving no marrow-depressant therapy, before and after a full-mouth intraoral roentgenographic examination consisting of 14 periapical films including the following areas: upper right molar, upper right bicuspid, upper right cuspid, upper central incisor, upper left cuspid, and upper left molar area in addition to the same tooth areas filmed in the lower jaw. Exposure for each area of the mouth was made in

6. Sixth International Congress of Radiology. Recommendations of the international commission on radiological protection. National Bureau of Standards Handbook 47. Washington, D. C., Department of Commerce, 1951.

7. Glasser, O., and others. Physical foundations of radiology, ed. 2. New York, Harper & Bros., 1952, p. 184.

8. Budowsky, J., and others. Radiation exposure to the head and abdomen during oral roentgenography. J.A.D.A. 52:555 May 1956.

accordance with the directions for exposure of Eastman Kodak Radiatized film (Table 2). Complete exposure of both arches required approximately 41 seconds. Physical data on the x-ray machine used is also included in Table 2.

Since blood counts in normal individuals are known to vary spontaneously and regularly during the course of the day, normal (for the individual patient) baseline determinations were made of the various elements of the blood to be studied during a 24 hour period of observation for the 24 hours prior to exposure to radiation. Readings were taken at 10 A.M., 1 P.M. and 4 P.M. on the day (Day 1) prior to radiation, and again at 9 A.M. (Day 2) on the day radiation was administered. At approximately 9:10 A.M. on Day 2 (directly after the taking of the final baseline blood sample) the full-mouth series of roentgen rays was exposed as described.

After exposure to radiation, blood specimens were again drawn at 11:30 A.M., 2:30 P.M., and 4:30 P.M. on Day 2; at 10 A.M. and 3:30 P.M. on Day 3; at 9:30 A.M. on Day 4, and at 10 A.M. one week after the initial exposure, Day 8. The over-all schedule for withdrawal of blood specimens together with the elapsed time after exposure to radiation appear in Table 3. All laboratory procedures were performed by one experienced technician.

The following hematologic examinations were made for each specimen: total white cell blood count, differential white cell count, (including polymorphonuclear leukocytes, lymphocytes, monocytes, basophils, and eosinophils) and platelet count. The white cell count and differential count were obtained using Wright stained smears; the platelet count was obtained using the direct counting method of Rees and Ecker. Platelets were also estimated on each smear with every count. Readings of smears for white cell counts each represented the average of two different determinations from separate pipette specimens—each counting 200 white cells.

RESULTS

The results of each of the hematologic determinations made for each patient before and after exposure to radiation, on which our conclusions were based, appear in Table 3.

Table 2 • Film exposure time, angulation and physical data on x-ray unit

X-ray unit		
Manufacturer	X-ray Corporation of America	
Model #	3A	
Serial #	4197	
Kilvoltage	65	
Milliamperage	10	
Filtration	½ mm. aluminum (inherent)	
Target to tip of cone	8 inches (short cone technic) field size at 8 inches was 4⅛ inches in diameter	
	Angulation	Exposure (seconds)
Upper molar	+20°	4½
Upper biscupid	+30°	3
Upper cuspid	+45°	2½
Upper central incisor	+40°	3
Lower central incisor	−15°	2
Lower cuspid	−20°	2½
Lower bicuspid	−10°	2½
Lower molar	− 5°	3

Table 3 • Over-all schedule for withdrawal of blood specimens and individual recordings of each of the hematologic determinations performed before and after exposure to radiation in ten adult subjects

Patient	Day	Approx. number of hours bef. or after radiation	WBC	Polys.	Diff.	Lymph.	Mon.	Bas.	Eos.	Platelets
				%	%	%	%	%	%	
1	1	−23	5,750	64	7–57	21	12	1	2	280,000
	1	−20	8,450	57	11–46	30	9	0	4	265,000
	1	−16	5,775	70	5–65	18	10	0	2	267,000
	2	− 0	5,550	69	8–61	19	9	0	3	290,000
	2	+ 2	5,500	63	8–55	22	10	0	5	273,000
	2	+ 5	5,700	70	5–65	20	8	0	2	270,000
	2	+ 7	5,925	64	9–55	22	8	0	6	270,000
	3	+24½	7,000	65	9–56	21	9	0	5	290,000
	3	+30	6,050	65	6–59	21	9	0	5	290,000
	4	+48	6,200	63	6–57	25	7	0	5	276,000
	8	+72½	7,450	69	5–64	17	9	0	5	279,000
2	1	−23	6,125	58	5–53	33	3	0	6	250,000
	1	−20	7,925	53	11–42	37	5	0	5	230,000
	1	−16	6,700	61	3–58	27	7	0	5	270,000
	2	− 0	6,800	61	8–53	31	4	0	4	267,000
	2	+ 2	6,900	63	6–57	24	8	1	4	285,000
	2	+ 5	7,000	57	5–52	30	7	1	5	290,000
	2	+ 7	6,120	56	5–51	32	10	0	2	295,000
	3	+24½	7,325	62	10–52	30	6	0	2	290,000
	3	+30	7,025	56	9–47	32	7	1	4	270,000
	4	+48	6,670	59	7–52	30	6	1	4	288,000
	8	+72½	6,375	57	5–52	34	4	0	5	275,000
3	1	−23	9,870	81	10–71	15	4	0	0	258,000
	1	−20	11,450	77	11–66	18	5	0	0	261,000
	1	−16	9,450	79	10–69	13	6	1	1	280,000
	2	− 0	9,850	73	8–65	20	3	1	3	250,000
	2	+ 2	12,300	78	10–68	17	4	0	1	285,000
	2	+ 5	11,050	72	9–63	18	8	0	2	295,000
	2	+ 7	10,750	72	10–62	18	7	2	1	276,000
	3	+24½	11,200	72	15–57	20	5	1	2	280,000
	3	+30	10,800	77	12–65	17	5	0	1	278,000
	4	+48	11,250	80	17–63	12	7	0	1	265,000
	8	+72½	10,250	76	18–58	15	6	0	3	282,000
4	1	−23	6,700	77	5–72	20	2	0	1	490,000
	1	−20	8,700	67	11–56	26	7	0	0	410,000
	1	−16	6,800	68	3–65	22	8	0	2	420,000
	2	− 0	6,975	69	5–64	20	8	2	1	480,000
	2	+ 2	6,750	75	5–70	18	4	0	3	470,000
	2	+ 5	6,250	68	5–63	20	8	2	2	488,000
	2	+ 7	6,550	65	7–58	23	10	0	2	460,000
	3	+24½	6,700	69	10–59	20	9	0	2	483,000
	3	+30	5,900	69	8–61	20	6	1	4	484,000
	4	+48	6,225	72	7–65	20	7	0	1	490,000
	8	+72½	7,625	76	7–69	17	6	0	1	460,000
5	1	−23	8,850	76	9–67	18	6	0	0	324,000
	1	−20	7,200	68	5–63	22	8	0	2	.....
	1	−16	6,150	54	7–47	35	9	1	1	.....
	2	− 0	6,000	54	4–50	36	7	0	3	.....
	2	+ 2	5,750	53	6–47	36	10	0	1	.....
	2	+ 5	5,225	56	7–49	32	7	0	5	.....
	2	+ 7	5,150	55	8–47	34	6	0	5	.....
	3	+24½	5,000	55	8–47	35	7	0	3	.....
	3	+30	5,500	56	6–50	34	9	0	1	.....
	4	+48	5,125	53	8–45	36	9	1	1	.....
	8	+72½	5,025	55	6–49	34	9	0	2	300,000

Table 3 • (Contined)

Patient	Day	Approx. number of hours bef. or after radiation	WBC	Polys.	Diff.	Lymph.	Mon.	Bas.	Eos.	Platelets
				%	%	%	%	%	%	
6	1	−23	5,900	65	7–58	25	9	0	1	224,000
	1	−20	7,600	74	8–66	18	8	0	0	.....
	1	−16	6,500	66	5–61	26	5	0	3	.....
	2	− 0	8,800	75	6–69	18	4	1	2	.....
	2	+ 2	10,250	80	19–61	14	5	0	1	.....
	2	+ 5	12,050	83	25–58	13	3	0	1	.....
	2	+ 7	12,450	80	22–58	13	6	0	1	.....
	3	+24½	11,950	80	20–60	14	5	0	1	.....
	3	+30	11,625	80	22–58	15	5	0	0	.....
	4	+48	11,100	75	18–57	20	5	0	0	.....
	8	+72¼	11,700	76	15–61	17	5	0	2	235,000
7	1	−23	7,350	72	8–64	23	4	0	1	310,000
	1	−20	8,000	71	5–66	20	7	0	2	.....
	1	−16	9,900	68	6–62	21	7	1	3	.....
	2	− 0	7,850	65	5–60	25	8	0	2	.....
	2	+ 2	7,000	63	6–57	29	7	0	1	.....
	2	+ 5	8,100	70	5–65	25	3	0	2	.....
	2	+ 7	7,750	61	4–57	29	7	1	2	.....
	3	+24½	7,150	63	4–59	26	8	0	3	.....
	3	+30	7,950	66	10–56	23	8	0	3	.....
	4	+48	6,950	66	7–59	25	7	1	1	.....
	8	+72½	7,500	65	7–58	25	8	1	1	340,000
8	1	−23	10,600	64	6–58	26	4	1	5	205,000
	1	−16	10,000	60	5–55	22	4	1	13	.....
	2	− 0	10,270	65	7–58	22	4	1	8	.....
	2	+ 2	9,450	62	5–57	26	5	0	7	.....
	2	+ 5	9,900	65	7–58	21	6	0	8	.....
	2	+ 7	9,700	60	5–55	23	7	0	10	.....
	3	+24½	9,500	62	9–53	26	4	0	8	.....
	3	+30	9,750	63	10–53	24	4	0	9	.....
	4	48	9,025	59	7–52	28	6	0	7	.....
	8	+72½	9,050	58	5–53	26	8	0	8	220,000
9	1	−23	5,350	57	2–55	31	10	1	1	296,000
	1	−20	5,925	65	4–61	25	10	0	0	.....
	1	−16	5,075	63	4–59	26	11	0	0	.....
	2	− 0	5,200	63	6–57	27	9	0	1	.....
	2	+ 2	5,750	61	5–56	25	10	2	2	.....
	2	+ 5	5,350	56	6–50	28	10	2	4	.....
	2	+ 7	5,750	64	7–57	25	9	0	2	.....
	3	+24½	5,075	57	8–49	30	10	0	3	.....
	3	+30	6,275	53	7–46	28	11	3	5	.....
	4	+48	5,650	55	4–51	31	10	2	2	.....
	8	+72½	5,750	49	3–46	38	10	1	2	305,000
10	1	−23	11,100	77	13–64	19	3	0	1	265,000
	1	−20	11,900	77	10–67	16	3	0	4	.....
	1	−16	11,350	76	10–66	18	3	0	3	.....
	2	− 0	11,600	79	8–71	17	2	0	2	.....
	2	+ 2	11,550	73	8–65	18	6	1	2	.....
	2	+ 5	11,150	72	13–59	21	3	0	4	.....
	2	+ 7	11,450	69	13–56	20	8	1	2	.....
	3	+24½	11,100	72	12–60	20	5	1	2	.....
	3	+30	11,050	71	20–51	19	5	1	4	.....
	4	+40	10,750	71	15–56	20	4	1	4	.....
	8	+72½	10,050	72	14–58	21	6	0	1	270,000

The following over-all criteria[9] were used in evaluating the hematologic reaction to radiation shown by each patient: the range of normal for the white cell count was taken as 6,000 to 10,000; individual variations are seen from day to day and during the course of the day independent of exogenous factors; white cell counts are usually lower in the morning than in the early afternoon, differing by some 500 to 1,000; for a corresponding time of day, changes in blood counts in excess of 10 per cent (in either direction, above or below either the individual's high or low base line) were considered significant; a deviation in either direction of greater than 5 per cent between baseline and postexposure lymphocyte counts was considered significant; a change of 50,000 in platelet count from the highest or lowest baseline count was deemed significant; changes in the remaining formed elements of the blood were looked for in terms of consistent, noticeable deviation from the base line in one direction, which deviation was of clinically significant proportions.

From our observations, it was not possible to discern any consistent, clinically significant (in terms of the afore-mentioned criteria) differences in findings obtained before and after exposure to radiation in the 10 patients studied under the conditions of this investigation. Variations within normal limits for the individual were observed routinely during the day and from day to day as would be expected. Those changes occurring in the total white cell count in terms of the criteria used were of only borderline significance and in the various instances were in opposite directions.

The same borderline type changes (high in some patients, low in others) were seen in the leukocyte, lymphocyte and platelet counts. These changes, especially considering the opposite direction of the changes encountered in the different patients, were not considered significant and particularly not so clinically. In view of the acknowledged, considerable sensitivity of platelet tissues to radiation damage, and since no important changes were noted in preradiation and postradiation platelet counts, it would not seem that radiation encountered in intraoral procedures resulted in any clinically or otherwise significant hematologic changes.

It is obvious that were additional roentgenograms taken to supplement the series of 14 roentgenograms in order to perform a larger full-mouth survey, then the neck and head areas would be exposed to more radiation, and perhaps the maximum dosage that would not result in unfavorable sequelae might be exceeded. Similarly, repetition of the roentgenographic examination at too short intervals or in patients otherwise exposed to radiation by virtue of therapy for illness or because of occupation would also compound these hazards. Also it should be noted that a 14 film full-mouth roentgenographic examination is not considered adequate by many authorities, especially if most of the dentition is present. Hence further studies would seem in order to ascertain the level of radiation exposure at which such changes might occur.

SUMMARY

Hematologic studies were carried out on ten volunteer adult patients to determine the possible effect of exposure to a full-mouth roentgenographic examination of 14 periapical roentgenograms on the formed elements of the blood as evidenced by changes in the total white cell count, differential white cell count, and platelet count performed at suitable periods (one day before and up to seven days afterward) after exposure to roentgen-ray radiation. In terms of the testing procedures utilized, no significant hematologic changes of clinical importance were noted between findings before and after exposure to radiation under the conditions of this study.

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Effect of fluoride, iodoacetic acid, penicillin, sodium lauroyl sarcosinate and dehydroacetic acid on certain oral bacteria of white rats fed a smooth surface caries diet: preliminary report

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There have been numerous studies of the oral bacteria of the rat and their relation to the presence of dental caries. A number of these studies indicate that there are changes in the oral lactobacillus population in rats receiving caries potentiating or inhibiting agents.[1-8] Since most of these studies have pertained to occlusal caries, it appeared of interest to study the oral flora of rats in relation to the development of smooth surface caries. Recently a number of studies have appeared relative to a type of smooth surface caries produced extensively in white rats particularly by diets containing processed skim milk powders.[9-17] This study pertains, therefore, to certain oral bacteria of rats receiving a cariogenic skim milk powder diet alone, and modified respectively by fluoride, iodoacetate, penicillin, sodium lauroyl sarcosinate (SLS) and dehydroacetic acid (DHA).

MATERIALS AND METHODS

Experimental Groups • The rats used for this bacteriological study were from studies previously reported by McClure, Folk and Rust,[14] and Zipkin and McClure.[15] Experiments I and II correspond to experiments 1-a, through 1-c and 2-a through 2-g, respectively, as reported by McClure, Folk and Rust.[14] Experiment III corresponds to Zipkin and McClure's experiment D.[15]

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Table 1 • Effect of autoclaved skim milk powder, sodium fluoride and iodoacetate on smooth surface caries in white rats

Groups	No. of rats	No. of days on expt.	Daily gains (Gm.)	Rats with caries %	Carious teeth per rat (Av.)	Severity score per rat (Av.)
636	35	90	0.3	82.9	4.9	14.6
636F	33	90	0.3	21.2	0.4	0.7
636I	33	90	0.2	18.2	0.5	0.5

Taken from McClure, Folk and Rust.[14]

The experimental design[14, 15] is indicated in the accompanying tabulation.

The caries data appearing in Tables 1 and 3 were obtained at the end of 90 days, and those in Table 5 at 60 days.[14, 15]

Bacteriological Sampling • A sterile swab stick prepared by rolling a piece of absorbent cotton on a wood applicator 1/16 by 6 inches was used to obtain material from the molar areas of each rat. The cotton swab was placed in a 10 ml. sterile 0.025 per cent aqueous Difco yeast extract, mixed thoroughly, and aliquots were removed for further dilution. The bacterial counts from each rat were made by inoculating a single plate of the appropriate medium. Difco Violet Red Bile Agar Medium (VRB) was used for the enumeration of coliforms; crystal-violet azide agar medium (CVA) with 2.5 per cent sterile defibrinated sheep blood was used for streptococci,[18] and SL Agar for lactobacilli.[19] The VRB, CVA and SL Agar plates were incubated aerobically at 37°C. for 24, 48, and 72 hours respectively. The colonies on each plate were counted by using either a Spencer Colony Counter or a Bausch and Lomb stereoscopic wide field microscope. The bacterial counts from rats on the various diets (experimental rats) were compared with those from animals on Diet 636 (control rats) according to Student's "t" test. Differences of the means at the 5 per cent level of probability were considered significant.

RESULTS

Both iodoacetic acid and sodium fluoride caused a very pronounced inhibition of caries (Table 1).[14] When comparisons of bacterial counts were made between rats receiving Diets 636 and 636I (Table 2), rats on the latter diet gave significant reductions of the lactobacillus count on the forty-second day and coliform counts on the seventy-seventh day. The streptococcal count was not significantly reduced. Sodium fluoride appeared to have no significant effect on the lactobacillus and coliform counts but caused a significant reduction in the streptococcal counts on the forty-second and seventy-seventh day.

The lactobacillus, coliform, and the streptococcal counts obtained from rats on Diet 636 on the fourteenth day were not significantly different from those obtained on the forty-second day and seventy-seventh day.

The next study was conducted with groups of rats on Diet 636 alone and with the addition of two levels each of sodium fluoride, penicillin and iodoacetic acid. Inhibition of caries occurred with

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13. Losee, F. L., and Nemes, J. L. Human type caries distribution in Osborne-Mendel rats kept on a heated skim milk powder diet. Proc. Soc. Exper. Biol. & Med. 87:429 Nov. 1954.

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15. Zipkin, I., and McClure, F. J. Effect of sodium lauroyl sarcosinate and dehydroacetic acid in sulcal and smooth surface caries (buccal-lingual) in the white rat. J.A.D.A. 55:15 July 1957.

16. Stephan, R. M. Development of caries on the buccal and lingual tooth surfaces of rats as well as proximal and fissure caries (Abst.) J.D. Res. 30:484 Aug. 1951.

17. Stephan, R. M., and Harris, M. R. Location of experimental caries on different tooth surfaces in the Norway rat. In Advances in experimental caries research, Sognnaes, R. F. Washington, D. C., American Association for the Advancement of Science, 1955, p. 187.

18. Fitzgerald, R. J. Preliminary studies on the presence of acid phosphatase in certain oral microorganisms. J.D. Res. 31:189 April 1952.

19. Rogosa, M.; Mitchell, J. A., and Wiseman, R. F. A selective medium for the isolation and enumeration of oral lactobacilli. J.D. Res. 30:682 Oct. 1951.

	Group	Diet	Drinking fluid
Experiment I (Tables 1 & 2)	636	636	Water
	636F	636	50 ppm F as sodium fluoride
	636I	636+20 ppm iodoacetic acid	200 ppm iodoacetic acid
Experiment II (Tables 3 & 4)	636	636	Water
	$636F_{25}$	636	25 ppm F as sodium fluoride
	$636F_{50}$	636	50 ppm F as sodium fluoride
	$636I_{60}$	636+50 ppm iodoacetic acid	10 ppm iodoacetic acid
	$636I_{120}$	636+100 ppm iodoacetic acid	20 ppm iodoacetic acid
	$636P_5$	636+5 units penicillin/Gm.	Water
	$636P_{10}$	636+10 units penicillin/Gm.	Water
Experiment III (Tables 5 & 6)	636	636	Water
	636SLS	636+0.5 per cent sodium lauroyl sarcosinate	Water
	636DHA	636+0.1 per cent dehydroacetic acid	Water

Tabulation showing experimental design

iodoacetic acid, penicillin and sodium fluoride at each of the two concentrations used (Table 3).[14] Counts of the various microorganisms from rats on diets containing these cariostatic agents were compared with those obtained from rats on Diet 636 alone (Table 4). At the end of 50 days, rats on Diet $636I_{120}$ and on diets containing penicillin showed significant reductions in the lactobacillus counts, whereas sodium fluoride had no significant effect on lactobacillus counts. All of the agents at the two concentrations used had no significant effect on the coliform counts. The streptococcal counts were significantly reduced by the two concentrations of iodoacetic acid. Fluoride caused no change in the streptococcal counts, whereas the results with penicillin were equivocal. After 90 days on the experiment, there were no significant changes in the lactobacillus, coliform and streptococcal counts from rats on any of the experimental diets. Both lactobacillus and streptococcal counts obtained from rats on Diet 636 for 90 days were signifi-

Table 2 • Effect of autoclaved skim milk powder, sodium fluoride, and iodoacetate on lactobacilli, coliforms and streptococci from molar areas of rats receiving a diet producing smooth surface caries

Groups	Number of days on diet	Number of rats	Number per swab		
			Lactobacilli* X 10^3	Coliforms* X 10^3	Streptococci* X 10^3
636	14	5	151±110	80±25	1773±874
636F	14	5	194±158	94±45	226± 66
636I	14	5	10± 5	151±28	131± 26
636	42	20	175± 58	170±41	1219±280
636F	42	20	281±139	84±30	577±157
636I	42	20	30± 14	116±19	621±171
636	77	20	60± 62	28± 9	1117±197
636F	77	20	218±132	13± 7	326± 76
636I	77	11	19± 10	<1	658±142

*All values are expressed as the mean ± standard error.

Table 3 • Effect of autoclaved skim milk powder, sodium fluoride, iodoacetate, and penicillin on smooth surface rat caries

Groups	No. of rats	No. of days on expt.	Daily gains (Gm.)	Rats with caries %	Carious teeth per rat (Av.)	Severity score per rat (Av.)
636	28	90	0.8	89.3	3.8	8.4
$636F_{25}$	13	90	0.8	46.2	0.5	0.9
$636F_{50}$	13	90	0.9	15.4	0.3	0.9
$636I_{88}$	12	90	0.8	66.7	1.6	2.4
$636I_{138}$	12	90	0.6	50.0	1.2	2.2
$636P_5$	13	90	0.8	30.8	0.6	0.7
$636P_{10}$	13	90	0.9	15.3	0.2	0.3

Taken from McClure, Folk and Rust.[14]

cantly lower than those obtained after 50 days, whereas the coliform counts remained unchanged.

The data in Table 5, as previously reported,[15] show that sodium lauroyl sarcosinate inhibited caries whereas dehydroacetic acid increased both the incidence and severity of caries. When rats were on diets containing these agents (Table 6), neither lactobacillus counts (at 19 and 33 days) nor streptococcal counts (at 19 days) differed significantly from the counts from rats on Diet 636 unsupplemented. Rats on Diet 636SLS for 46 days showed no difference in the lactobacillus and streptococcal counts when compared with rats on Diet 636; however, with rats on Diet 636DHA, there was a significant increase in the lactobacillus and streptococcal counts. On the fifty-ninth day of the experiment, the lactobacillus counts were reduced significantly in the rats on Diet 636SLS, whereas they were increased significantly in those on Diet 636DHA. The streptococcal counts were significantly reduced for those on Diet 636SLS but remained unchanged with Diet 636DHA. The lactobacillus counts obtained from rats on Diet 636 on the nineteenth day were not significantly different from those obtained on the thirty-third and fifty-ninth days. The streptococcal counts showed a significant increase on the forty-sixth and fifty-ninth days.

DISCUSSION

From the data presented, it is not possible to show any consistent relationship between the bacteria studied and the development of smooth surface caries in

Table 4 • Effect of autoclaved skim milk powder, sodium fluoride, iodoacetate, and penicillin on lactobacilli, coliforms and streptococci from molar areas of rats receiving a diet producing smooth surface caries

Groups	Number of days on diet	Number of rats	Number per swab		
			Lactobacilli* X 10^3	Coliforms* X 10^3	Streptococci* X 10^3
636	50	32	210 ± 21	84 ± 14	1197 ± 168
$636F_{25}$	50	15	290 ± 102	128 ± 31	1321 ± 166
$636F_{50}$	50	15	311 ± 142	61 ± 12	1354 ± 375
$636I_{88}$	50	14	118 ± 53	133 ± 37	710 ± 138
$636I_{138}$	50	19	81 ± 20	88 ± 12	724 ± 100
$636P_5$	50	19	26 ± 16	102 ± 21	780 ± 114
$636P_{10}$	50	14	11 ± 4	218 ± 53	1101 ± 339
636	90	31	54 ± 17	148 ± 56	790 ± 154
$636F_{25}$	90	13	223 ± 123	44 ± 20	890 ± 310
$636F_{50}$	90	12	330 ± 167	210 ± 160	730 ± 120
$636I_{88}$	90	11	35 ± 19	220 ± 166	610 ± 280
$636I_{138}$	90	14	121 ± 48	49 ± 18	730 ± 130
$636P_5$	90	18	82 ± 43	130 ± 38	495 ± 125
$636P_{10}$	90	14	265 ± 107	65 ± 24	940 ± 250

*All values are expressed on the mean ± standard error.

rats on all diets studied. In addition, the large and quantitatively variable standard errors preclude any comparison of the relationship between the bacterial population and the various diets used in the study.

Certain trends can be seen, however; for example, if all of the lactobacillus counts from rats on the various diets are compared on the basis of whether they are greater or smaller than the counts from rats on Diet 636 alone, it can be seen that there were (1) higher counts in rats on Diet 636 supplemented with fluoride or DHA, (2) lower counts in those on Diet 636 with iodoacetic acid or SLS, and (3) no difference in counts in those on Diet 636 with penicillin.

These experimental findings suggest that lactobacillus counts were decreased when iodoacetic acid and penicillin (60 days only) were added to a diet producing smooth surface caries (Diet 636). To this extent, these findings agree with the findings by other investigators[4-7, 20] who used coarse particle diets. Our results with fluoride, however, do not agree with those of Harrison.[4, 5] The effect of SLS, which inhibited smooth surface caries, and DHA, which increased the caries, suggests a reduction in the lactobacillus counts with the former and an increase with the latter. With the coliform or streptococcal counts, no consistent trends were observed.

Table 5 • Effect of autoclaved skim milk powder, sodium lauroyl sarcosinate and dehydroacetic acid on smooth surface rat caries

Groups	No. of rats	No. of days on expt.	Daily gains (Gm.)	Rats with caries %	Carious teeth per rat (Av.)	Severity score per rat (Av.)
636	36	60	1.2	69.4	1.5	2.3
636SLS	34	60	1.2	29.4	0.6	1.0
636 DHA	28	60	0.8	100.0	7.1	30.5

Taken from Zipkin and McClure.[33]

SUMMARY

A study has been made of lactobacillus, streptococcal and coliform counts from molar areas in white rats receiving Diet

20. Webman, H.; Hill, T. J., and Kniesner, A. H. Effect of penicillin on dental caries in rats fed on a coarse corn diet. J.D. Res. 28:258 June 1949.

Table 6 • Effect of autoclaved skim milk powder, sodium lauroyl sarcosinate and dehydroacetic acid on lactobacilli and streptococci from molar areas of rats receiving a diet producing smooth surface caries

Groups	Number of days on diet	Number of rats	Number per swab	
			Lactobacilli* X 10^3	Streptococci* X 10^3
636	19	38	101 ± 36	384 ± 53
636SLS	19	36	163 ± 126	260 ± 31
636DHA	19	33	203 ± 53	485 ± 61
636	33	37	130 ± 120	
636SLS	33	34	4 ± 2	
636DHA	33	28	55 ± 18	
636	46	37	53 ± 11	575 ± 79
636SLS	46	36	31 ± 10	580 ± 77
636DHA	46	26	215 ± 30	1078 ± 166
636	59	34	74 ± 20	800 ± 96
636SLS	59	36	18 ± 6	435 ± 63
636DHA	59	29	208 ± 40	838 ± 101

*All values are expressed as the mean ± standard error.

636 supplemented with sodium fluoride, penicillin, iodoacetic acid, sodium lauroyl sarcosinate and dehydroacetic acid.

The counts of the various microorganisms were not consistent in all experiments, and under the conditions employed, no particular group or groups of bacteria studied could be shown to be clearly associated with the production of smooth surface caries.

Giant cell tumor of the jaws

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It is the purpose of this paper to review some of the diagnostic features of the giant cell tumor of the jaws, and to emphasize their significance, particularly from the standpoint of treatment.

The central giant cell tumor has been discussed extensively in the literature and was first described in the jaws by Warren in 1837.[1] It has been called osteoclastoma, myeloid sarcoma, giant cell sarcoma, chronic hemorrhagic osteomyelitis, and recently, giant cell reparative granuloma.[2]

CLINICAL FEATURES

In children, the earliest signs of central giant cell tumors may be an expansion of bone with premature loosening and shedding of deciduous teeth. Older patients may exhibit a deforming bone expansion with abnormal spacing of teeth. Usually there are no subjective symptoms such as pain, but swelling or bulging of the jaw is one of the commonest early complaints.[3] Dentures worn over the region may become uncomfortable. Devitalization of teeth and root resorption are known to occur.

When growth of the tumor is rapid, perforation of the cortex may occur. Tumors which have perforated the cortex often impart a bluish cast to the overlying mucous membrane in a manner suggestive of a cyst or angioma. Palpation, however, usually reveals a firm, noncompressible mass, rarely fluctuant enough to be confused with a cyst. Occasionally, the rapidly growing tumor may perforate the mucous membrane. Giant cell tumors of the jaws do not metastasize,[4] nor is any instance of their malignant transformation recorded in the literature.[3]

The tumor tissue itself strongly resembles liver in color and consistency. The blue-brown color is due to large quantities of blood pigment in the mass. When there is a high lipid content, how-

1. Luck, Vernon J. Bone and joint diseases. Springfield, Ill., Charles C Thomas, 1950.

2. Jaffe, H. L. Giant-cell reparative granuloma, traumatic bone cyst, and fibrous (fibro-osseous) dysplasia of the jawbones. Oral Surg., Oral Med. & Oral Path. 6:159 Jan. 1953.

3. Waldron, C. A. Giant cell tumors of the jawbones. Oral Surg., Oral Med. & Oral Path. 6:1055 Sept. 1953.

4. Thoma, K. H. Oral surgery. St. Louis, The C. V. Mosby Co., 1948.

ever, the tissue may have a yellowish appearance.[4]

ROENTGENOGRAPHIC FEATURES

Commonly, the lesion is described roentgenographically as a poorly defined, trabeculated, radiolucent area with a vacuolated appearance.[5] This picture, however, is no longer regarded as pathognomonic, since the lesion is actually rather nonspecific in appearance, and has been described in different ways in the literature.[3,4,6] Teeth in the area may or may not become involved. Should the lamina dura be destroyed, the periodontal membrane is apt to be invaded.[4] The resulting pressure of the tumor mass may cause root resorption, as well as displacement and spreading of the teeth.

INCIDENCE AND LOCATION

Approximately 9 to 11 per cent of the giant cell tumors of the entire skeleton appear in the jaws.[7,8] In the jaws they occur more often in women than in men.[2,3] Although the tumors appear in persons of all ages, they are reported most frequently in the third and fourth decades of life.[2-4,7,8]

Conflicting reports appear as to the comparative incidence in the mandible and maxilla. The lower jaw is more frequently reported involved than the upper.[3-5] The most common sites are said to be the anterior and bicuspid region in the mandible, and the canine fossa and ethmoid regions in the maxilla.[4]

In the authors' 23 cases, 11 were in men, 12 in women.

Six instances were noted in the maxilla, as follows: in the anterior region, 1; the bicuspid region, 2, and in the anterior-bicuspid region, 3. Seventeen instances were in the mandible, as follows: in the anterior region, 6; bicuspid region, 2; anterior-bicuspid region, 1; the molar (inferior border), 1; bicuspid-molar region, 3, and in the anterior-bicuspid-molar region, 4. Extension through the cortex was observed in 13 patients.

Hyperparathyroidism occurred in three instances; of these, monostotic lesions occurred in two patients and polyostotic lesions occurred in one patient.

The surgical approach was intraoral in 22 instances, extraoral in 1 instance.

Recurrences appeared in two instances. These appeared within 1 to 2 years. In one instance the treatment had been curettage, and in the other, radiation.

It will be noted that these figures are essentially in agreement with those reported in the literature. In one instance, however, the authors' experience differed from that of other investigators—age distribution. The patients' ages ranged from 6 to 54 years. Most of the cases occurred in the 50 to 59 year age group (Fig. 1), compared with the 20 to 39 year group reported elsewhere.[2-4,7,8]

MICROSCOPIC APPEARANCE

The central giant cell tumor is characterized by a large number of giant cells containing from 15 to 200 nuclei. These are embedded in a stroma of round or spindle cells. The round cells are said to predominate in actively growing tumors.[4] The field is richly vascular, and red blood cells are seen almost as frequently extravascularly as intravascularly. The characteristic presence of large amounts of blood pigment indicate chronic extravasation of red blood cells. This accounts for the livid clinical appearance.

Microscopically, older tumors often show the development of considerable fibrous tissue. Heavy bands or partitions of such fibrous tissue may be the source

5. Salman, Irving, and Langel, Irwin. Benign central tumors of the jaws of nonosteogenic and nonodontogenic types. Oral Surg., Oral Med. & Oral Path. 7:960 Sept. 1954.

6. Berger, Adolph. Solitary central giant-cell tumor of the jaw bones. J. Oral Surg. 5:154 April 1947.

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8. Padgett, E. C. Surgical diseases of the mouth and jaws. Philadelphia, W. B. Saunders Co., 1938.

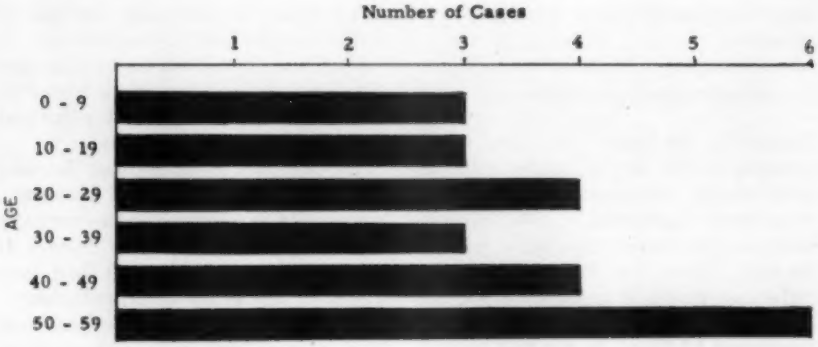

Fig. 1 • Age distribution of 23 patients with giant cell tumors of the jaws

of the roentgenographic appearance of trabeculations within the radiolucent area.[9] The tumor is usually not encapsulated. Bone spicules incorporated in the lesion may be the remainder of living remnants of bone or may represent efforts at repair.

DIFFERENTIAL DIAGNOSIS

Roentgenographically, the central solitary giant cell tumor has a rather nonspecific picture[3, 4, 6] which is often difficult to distinguish from other similar radiolucent lesions, such as ameloblastoma, ossifying fibroma, cyst, chondroma, angioma, eosinophilic granuloma or metastatic carcinoma. Microscopically, however, the differentiation can be made readily, with one exception, that is, hyperparathyroidism.

In hyperparathyroidism, bone lesions appear which may be indistinguishable clinically, roentgenographically and microscopically from the solitary central giant cell tumor[3] (Fig. 2 and cases 1 through 5). These lesions of hyperparathyroidism are often the first evidence of the disease, and are found frequently in the jaws.

The underlying cause of hyperparathyroidism, in most instances, is an adenoma of the parathyroid gland. In such instances, definite biochemical conditions are found. These conditions are characteristic of parathyroid hyperfunction and explain the formation of radiolucent central lesions. The following conditions are observed:

1. Increased urinary excretion of inorganic phosphorus, or hyperphosphaturia.
2. Decrease of the inorganic phosphorus content of the blood, or hypophosphatemia.
3. Increase of the calcium blood level, or hypercalcemia.
4. Excessive urinary excretion of calcium, or hypercalciuria.
5. Increase of the serum alkaline phosphatase.

These biochemical changes have been explained as follows:[10] Hyperactivity of the parathyroid adenoma leads to a rise in the parathormone blood level. The normal renal threshold for phosphorus excretion is lowered by the added parathormone and, as a result, the serum

9. Geschickter, Charles F., and Copeland, Murray M. Tumors of bone (including the jaws and joints), ed. 2. New York, American Journal of Cancer, 1936.

10. Snapper, I. Medical clinics on bone diseases: a text and atlas, ed. 2. New York, Interscience Publishers, Inc., 1949.

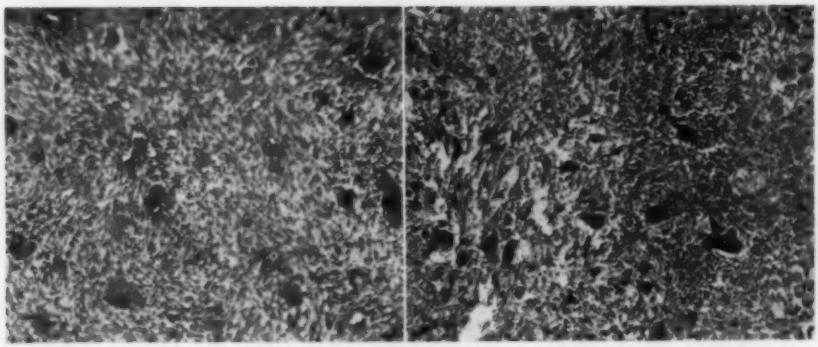

Fig. 2 • Left: Photomicrograph of biopsy material from giant cell tumor of maxilla in proved case of hyperparathyroidism. Right: Photomicrograph of biopsy material from giant cell tumor of mandible not related to hyperparathyroidism. Note similarity to that shown at left

phosphorus spills over into the urine. Increased urinary output of phosphorus, therefore, is attended by a decrease in serum phosphorus.

The solubility product of serum calcium and serum phosphorus is a constant. In order to maintain this solubility product in the presence of decreased serum phosphorus, the body attempts to increase the serum calcium. This is done by mobilization of calcium from bone by the osteoclasts. In the presence of a normal renal threshold for calcium, however, the increased serum calcium spills over into the urine, and hypercalciuria results. In the process of calcium mobilization, bone is destroyed. In an attempt to replace the lost bone, osteoblastic activity increases.

Osteoblastic hyperactivity is associated with an increase in serum alkaline phosphatase, an enzyme elaborated by the osteoblasts which liberates inorganic phosphorus from the organic phosphorus compounds of the blood, for bone formation. Alkaline phosphatase, therefore, is increased in all diseases where there is increased bone repair, that is, rickets, osteomalacia, Paget's disease and malignant bone metastases. None of these or other conditions, however, is associated with the complex biochemical conditions which produce the three characteristic signs of hyperparathyroidism, that is, hypercalcemia, hypophosphatemia and increased serum alkaline phosphatase.

In summary, giant cell tumors may be differentiated from other conditions clinically, roentgenographically or microscopically. The solitary central giant cell tumor and the brown tumors of hyperparathyroidism, however, cannot always be differentiated by these means. It is evident, therefore, that a dependable differential diagnosis between these two types of giant cell tumors can be made only with an adequate blood chemistry examination.

MANAGEMENT

Small tumors suspected of being central giant cell tumors should be removed completely for microscopic examination, if their total removal does not endanger any associated structures or threaten residual deformity. When the tumor is extensive, a small section should be taken for biopsy. The pathologist's verification of a central giant cell tumor must be followed by an examination of the serum calcium, phosphorus and alkaline phosphatase, and the urine should be tested for calciuria and

phosphaturia, to rule out hyperparathyroidism.

Once a diagnosis of hyperparathyroidism is suspected or has been established, the future management of the case should proceed under the close cooperation of the oral surgeon and the appropriate medical specialists. When blood chemistry examination has revealed an actual case of hyperparathyroidism, only then is skeletal roentgenography indicated to detect additional lesions and to record their progress. In giant cell tumors of the jaws unrelated to hyperparathyroidism, routine skeletal roentgenography is unnecessary, since polyostotic lesions are not characteristic.

The discovery of central giant cell tumors related to hyperparathyroidism is not an indication for further local surgical procedure. After biopsy such tumors should, in fact, be left strictly alone, since they will heal once the hyperparathyroidism is corrected. Removal of the parathyroid adenoma, which produces the abnormal concentration of parathormone in the blood, is the primary treatment and leads to replacement of the giant cell tumor with bone. Distortions of the bone, however, may not regress with healing after parathyroid adenectomy, or even irradiation. The bony regeneration may extend into and include the distorted contour.

Giant cell tumors unrelated to hyperparathyroidism, on the other hand, are treated directly. There are two major methods of treatment: (1) surgical removal and (2) irradiation. In the opinion of the authors, surgical removal is the treatment of choice. Irradiation may be employed when circumstances do not permit surgery. Certainly it should not be used as a routine treatment, since it has been shown that roentgen therapy in small and inadequate doses actually may stimulate the tumor growth and make it more aggressive.[1] In addition, roentgen therapy in the jaws may subject a patient to the chances of a severe and intractable osteomyelitis.[11] Such a hazard is unnecessary, since the results with surgery are excellent.

The surgical procedure employed in the treatment of giant cell tumors of the jaw has become more conservative even though recurrences may be noted occasionally. In the late 1800's, there was still a widespread practice of amputating the extremities in which giant cell tumors were found. Today, thorough local removal is the accepted treatment of choice. Recurrences are rather infrequent;[3] in the authors' 23 cases, there were two instances of recurrence.

Generally the position of giant cell tumors of the jaws permits intraoral removal. Sometimes, however, their position is such that only an extraoral approach will expose the area adequately. Involved teeth should be extracted and the tumor tissues thoroughly removed by assiduous curettage.

Giant cell tumors end abruptly at their bony walls and are not encapsulated. Careful and thorough curettage, therefore, is imperative to eliminate the possibility of overlooking viable tumor tissue. If tumor tissue perforates the bony plate and involves or erodes the periosteum, the overlying mucoperiosteum should be removed with the tumor. If the cavity is large, absorbable gelatin sponge soaked in an antibiotic solution may then be inserted, and the soft tissues approximated and sutured. When considerable intracavity bleeding is anticipated, a drain may be inserted between the sutures and removed after a day or two. An antibiotic should be prescribed for several days postoperatively. Healing is usually uneventful.

REPORTS OF CASE

Case 1 • In December 1950, a 53 year old woman experienced a hypoesthesia

11. Seldin, H. M., and others. Radio-osteomyelitis of the jaws. J. Oral Surg. 13:112 April 1955.

in the anterior portion of the left side of the mandible. This was followed soon by pain and tenderness localized in the lower left bicuspid region. There was a bulging of the cortical plate labially from the lower right lateral incisor to the lower left second bicuspid.

Roentgenographic Examination • Roentgenograms taken at that time showed a diffuse, irregular, radiolucent lesion of the mandible extending from the lower right lateral incisor to the lower left first bicuspid (Fig. 3).

Laboratory Findings • Biopsy of the lesion and blood examination revealed hyperparathyroidism, with the following blood chemistry values: serum calcium, 12.5 mg. per hundred cubic centimeters (normal is 9.5 to 11.0 mg.); serum phosphorus, 2.2 mg. per hundred cubic centimeters (normal is 2.5 to 3.5 mg.), and serum alkaline phosphatase, 10.8 Bodansky units (normal is 1.5 to 4.0 units). The patient was referred for medical and surgical treatment. A parathyroid adenoma was found and removed.

Course • After the removal of the parathyroid adenoma, the blood chemistry returned to normal. The lower left cuspid, lateral and central incisor and the lower right central and lateral incisors, however, failed to respond to the vitality test.

In July 1952, roentgenographic examination revealed that the osteolytic process had been arrested and that there was a filling in of bone. In March 1953, the bulging of the labial plate could still be felt in the lower anterior and left bicuspid regions. There was tenderness in the region of the left mental foramen which was felt to be due to impingement of bone on the mental canal. At this time the lower left lateral incisor and lower left cuspid appeared sensitive to percussion.

In June 1954, the lower left first bicuspid, the lower left cuspid and the lower left central incisor did not respond to the vitality test. Complete regeneration of bone in the formerly radiolucent region, however, had occurred (Fig. 4). No local surgical intervention, except removal of tissue for biopsy, was made in this instance. The mandibular lesion healed after removal of the parathyroid adenoma.

Case 2 • In February 1952, a microscopically verified, clinically typical, benign central giant cell tumor was removed from the upper right bicuspid-molar region of a 30 year old woman. The area healed uneventfully. Biochemical studies were not made.

When seen in July 1953, the patient complained of a painless buccal mass in the upper left cuspid-bicuspid region. The mass had been enlarging slowly since she first noticed it in January 1953.

Examination • A firm, nontender, irregularly-shaped mass about 2.5 by 1.5 cm. with ill-defined borders was visible buccally in the upper left cuspid-bicuspid region and extending deep to the mucobuccal fold. There was a bluish cast to the overlying, otherwise normal appearing, mucosa. The upper left posterior teeth were missing except for the third molar. The upper left cuspid responded slightly, and the upper left lateral incisor did not respond to the vitality test.

The patient was obese and walked with a peculiar limp or waddle which she attributed partly to the obesity and partly to a fall sustained in November 1952. She revealed, however, that the peculiar gait did not appear until six months after the fall, and that medical examination at the time of the accident, and subsequently, had been negative. Otherwise, the patient appeared normal.

Intraoral and occlusal roentgenograms revealed a radiolucent area involving the apex of the upper left lateral incisor. A larger radiolucent area extended from the distal side of the upper left cuspid to and

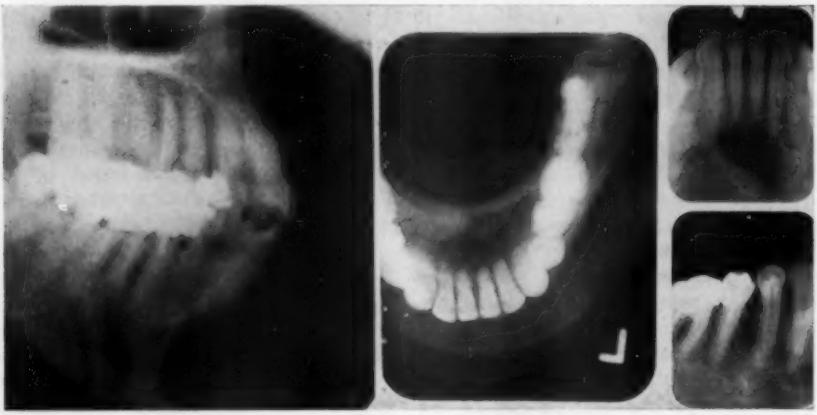

Fig. 3 • Case 1, 1951. Hyperparathyroidism with monostotic mandibular lesion. No local surgical intervention except removal of tissue for biopsy was made in this case

involving the anterior wall of the antrum (Fig. 5).

Operation • A livid hemorrhagic mass invading bone from the apical region of the upper left lateral incisor and cuspid to the region of the anterior wall and anterior part of the floor of the antrum was removed surgically with the lateral incisor and cuspid. The tissue was sent for biopsy.

The clinical diagnosis was (1) central giant cell tumor and (2) hyperparathyroidism.

Fig. 4 • Case 1, 1954. Regeneration of bone in formerly radiolucent areas after removal of parathyroid adenoma. Note regeneration into expanded area

Pathological Report • The macroscopic examination showed an almond-sized circumscribed tumor mass which was black and blue and firm.

The microscopic examination of the section revealed a cellular stroma which was vascular and hemorrhagic. The cells were large with ovoid shaped nuclei having prominent nucleoli. Multitudes of giant cells were present having many nuclei and a fine pink-staining cytoplasm. At the periphery and surrounding the mass was a mature fibrous connective tissue capsule. Within the capsule and adjacent to the mass were several spicules of viable bone fragments.

The pathological diagnosis was central benign giant cell tumor.

The contralateral appearance of a second maxillary central giant cell tumor, and the unexplained history concerning abnormality of gait further suggested hyperparathyroidism, with multiple bone involvement.

Later Examinations • Blood chemistry examination showed findings entirely consistent with hyperparathyroidism: the serum calcium was 15.7 mg. per hundred cubic centimeters; the serum phosphorus was 2.3 mg. per hundred cubic centimeters and the serum alkaline phosphatase was 13.7 Bodansky units.

Skull roentgenograms revealed a round, radiolucent area with a poorly defined border and some suggestion of internal trabeculation, extending from about 5 mm. from the inferior border of the mandible to the apical area of the lower right second bicuspid and the first molar region (Fig. 6, left).

Skeletal roentgenograms revealed large osteolytic areas in the left ilium and in the left pubic bone where a pathologic fracture at the descending ramus was apparent (Fig. 6, right).

An exploratory examination of the parathyroid glands in August 1953 revealed a left parathyroid adenoma which was removed by the general surgeon.

Fig. 5 • Case 2, 1953. Hyperparathyroidism with multiple bone lesions. Maxillary lesion extends from upper left lateral incisor into antrum

Progress • The blood chemistry returned to normal. In October, regression of the osteolytic area in the left ilium and almost complete regeneration of bone in the left pubic region was evident roentgenographically. The pathologic fracture of the descending ramus of the pubis apparently had undergone bony union with only slight residual deformity. At about the same time, however, there was little change in appearance of the lesion on the right side of the mandible.

In March 1954, the osteolytic lesions in the pelvis had about completely recalcified, although the trabecular pattern in the region of these defects had not been reorganized. The left pubic bone had recalcified completely, as is shown in Figure 7.

In June, roentgenograms of the right side of the mandible indicated almost complete regeneration of bone in the region of the former lesion (Fig. 7).

Intraoral roentgenograms of the upper right bicuspid-molar region taken at the same time revealed an area of bone regeneration (Fig. 7).

Over a period of several months after the removal of the adenoma, there was a steady improvement of the gait without any orthopedic treatment.

At the time of writing, there is no sign of gait defect. The patient has no com-

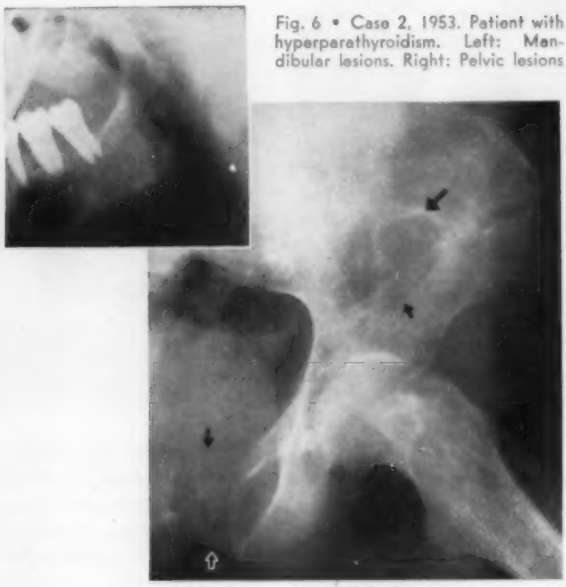

Fig. 6 • Case 2, 1953. Patient with hyperparathyroidism. Left: Mandibular lesions. Right: Pelvic lesions

plaints and appears to be enjoying good health.

In view of the patient's history, hyperparathyroidism should have been suspected, and blood and urine studies should have been made. The second surgical intervention, except for biopsy, was therefore unnecessary.

Case 3 • In September 1951, a 22 year old man complained of a slowly enlarging, painless mass in the right side of the lower jaw. He had first noticed the mass in March 1950.

Examination • A hard, walnut-sized mass, palpable at the inferior border of the right side of the mandible in the molar region, extended medially.

Roentgenographic examination revealed a large, round, well-demarcated, radiolucent lesion, with expansion of the inferior border in the region of the lower right second molar. The lower right third molar was absent (Fig. 8, left).

The tentative diagnosis was central giant cell tumor.

The laboratory findings were within normal limits.

Surgery • On December 21, the mass was removed extraorally. Removal of the expanded cortical bone revealed a firm, yellowish-white mass. The mass was found to have perforated the medial plate, but elsewhere was demarcated sharply by bone. Enucleation was accomplished easily and completely. The cavity was then filled with absorbable gelatin sponge (Gelfoam) soaked in mafenide hydrochloride (Sulfamylon Hydrochloride) and streptomycin. The deeper tissues and the skin were closed in layers.

The surgical diagnosis was osteofibroma, osteochondroma or giant cell tumor.

Pathological Report • The macroscopic description showed that the specimen consisted of spicules of bone and

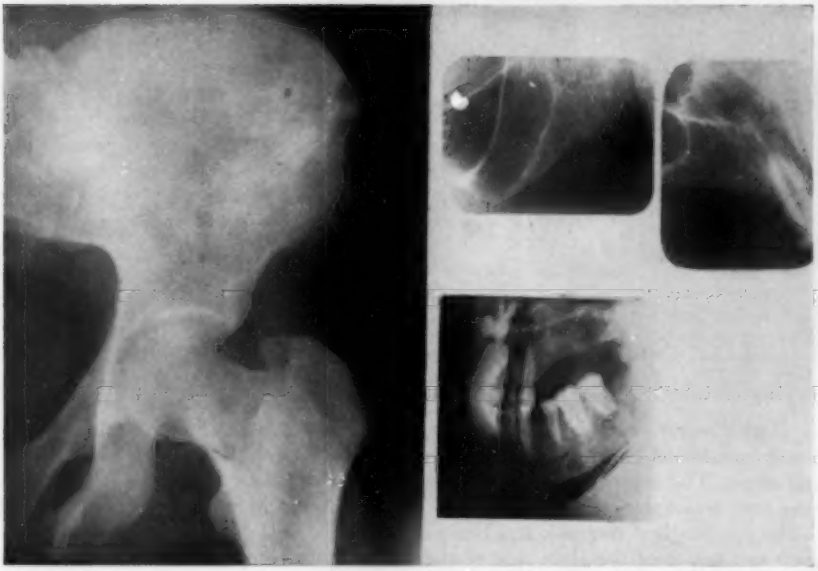

Fig. 7 • Case 2, 1954. Regeneration of bone after removal of parathyroid adenoma

firm brown tissue removed from the right side of the mandible.

The microscopic examination of the section of the soft tissue revealed a dense fibrotic stroma in which were numerous multinucleated giant cells. The nuclei were vascular and resembled the nuclei in the surrounding stromal cells. Tiny

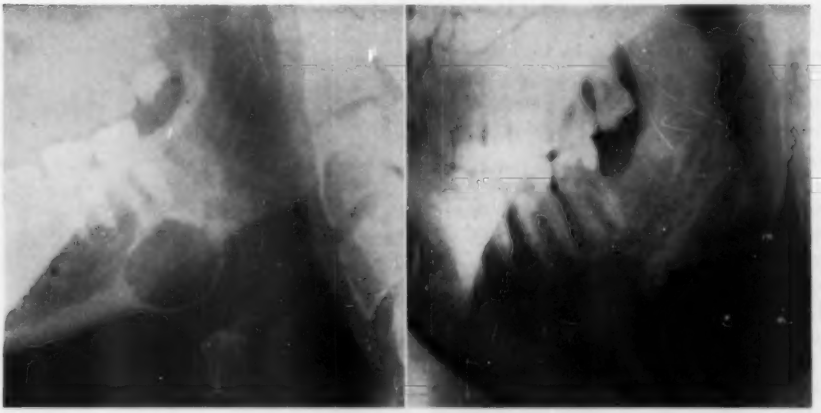

Fig. 8 • Case 3. Left: Preoperative view, 1951. Giant cell tumor at inferior border of mandible. Right: Postoperative view, 1953. Bone regeneration after surgical removal of tumor

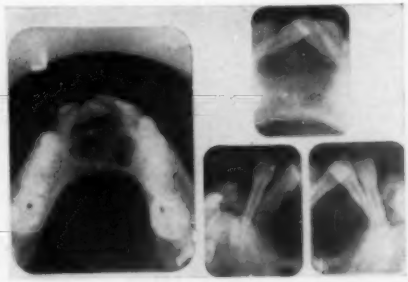

Fig. 9 • Case 4, 1951. Preoperative views of giant cell tumor of anterior portion of mandible in a seven and a half year old boy

capillaries permeated this dense stroma. Small spicules of bones were seen here and there. The larger portions of bone were not remarkable.

The pathological diagnosis was benign giant cell tumor of the right side of the mandible.

Course • The area from which the tumor was removed proceeded to fill with bone. By March 1953, bony regeneration had occurred (Fig. 8, right). The patient was symptom free and had no complaints. He will continue to be seen at regular intervals.

Case 4 • In December 1951, a healthy, well-developed, seven and a half year old boy appeared with a progressive malpositioning of the lower anterior teeth, of six months' duration.

Examination • The labial plate in the lower central area was not palpable. The region was soft, but not fluctuant, and the overlying mucosa had a bluish cast. The lower anterior teeth were tilted mesially. The lower central incisors did not respond to the vitality test.

Roentgenographic examination revealed a large, radiolucent lesion in the lower anterior region with the roots of the lower anterior teeth divergent (Fig. 9).

A tentative diagnosis was made of central giant cell tumor.

Surgery • A livid mass had destroyed the labial plate and perforated the lingual plate, in the lower central region. The mass was removed and the central incisors were left intact, because of the distal position of the central root apexes. The walls of the resulting cavity were carefully curetted. Absorbable gelatin sponge with streptomycin and mafenide hydrochloride was inserted, and the area was closed.

The surgical diagnosis was central benign giant cell tumor.

Pathological Report • The macroscopic examination showed a ragged piece of soft tissue which was hemorrhagic and "streaked with lime(?)."

The microscopic examination showed a stroma of loose, reticular fibrous connective tissues supporting a dense stippling of large cells with prominent round or ovoid nuclei and distinct chromatin and nucleoli. Many of these cells, which resembled endothelium, pooled their abundant cytoplasm to form multinucleated,

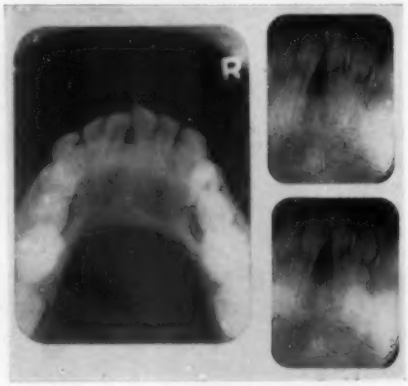

Fig. 10 • Case 4, 1954. Postoperative views showing regeneration of bone after removal of tumor

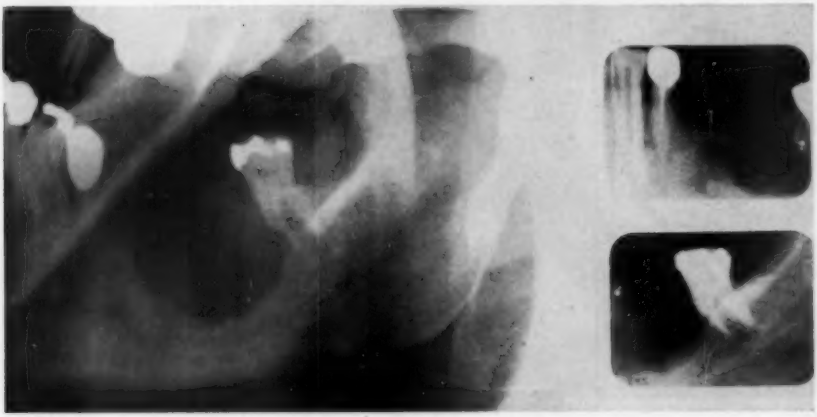

Fig. 11 • Case 5, 1949. Preoperative views of giant cell tumor of mandible in a 52 year old man

giant cells. These fused elements were especially prominent near the many thin-walled, irregular vascular channels and free extravasations which abounded in the tumor. There was some variation in cellular density in certain areas with small spicules of early bone present in some.

The pathological diagnosis was benign giant cell tumor, central type.

Laboratory Findings • Determinations of the serum calcium, phosphorus and alkaline phosphatase were reported to be within normal limits. A urinary calcium test also came within normal limits.

Course • The lower anterior teeth slowly approached their normal position. Bone regenerated completely in the former area of radiolucency (Fig. 10). The lower central incisors now responded to the vitality tester. The patient has continued to be seen at regular intervals.

Case 5 • In June 1949, a 52 year old man had a mass in the lower right molar region, discovered one month previously by his dentist, during the extraction of the lower right second molar.

Examination • A livid, hemorrhagic, soft mass was seen extruding from the unhealed lower right second molar socket. The buccal and lingual plates in the edentulous lower right second bicuspid and first and second molar region could not be palpated.

Roentgenographic examination revealed a fairly well-demarcated, round, radiolucent lesion, extending from the edentulous lower right second bicuspid region to the partially resorbed mesial root of the lower right third molar (Fig. 11).

A tentative diagnosis was made of central giant cell tumor.

Surgery • The lower right third molar was extracted. The mass was exposed and removed carefully with curets. Absorbable gelatin sponge moistened in a solution of streptomycin was inserted, and the cavity was closed.

The surgical diagnosis was central giant cell tumor.

Pathological Report • The macroscopic examination showed ragged fragments of soft tissue (the consistency of

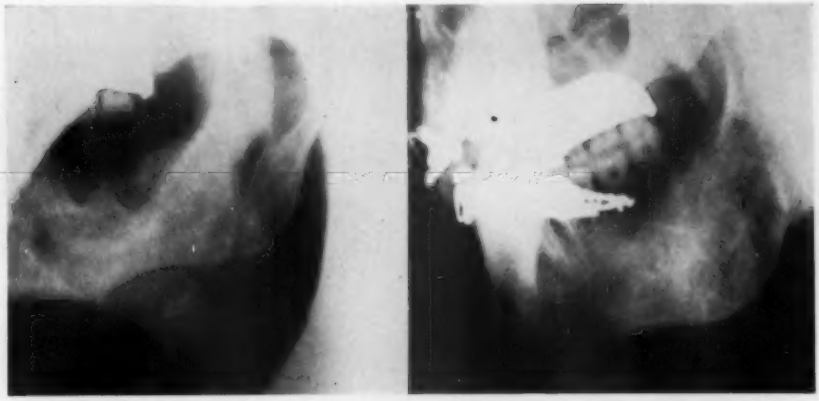

Fig. 12 • Case 5. Left: 1950 view. Growth of mass immediately after irradiation. Right: 1953 view. Eventual regeneration of bone after irradiation

liver), which were blood-drenched. The fragments were streaked white in scattered areas.

The microscopic examination showed that a fibrillar connective tissue reticulum was studded throughout with multinucleated giant cells in varying stages of maturity. The giant cells were well scattered but at times were to be seen surrounding spicules of bone. They hugged the margins of numerous vascular channels. Connective tissue was more loosely arranged. Fibroblasts were spindlelike in shape with long delicate fibrils interlacing. Hemorrhage was evident everywhere. No sign of malignancy was evident.

The pathological diagnosis was benign giant cell tumor (central type).

Course • The blood chemistry examination was negative. The patient was seen for routine postoperative treatment and then at regular intervals. In March 1950, he had a rather aggressive appearing recurrence of the tumor. A second surgical removal with biopsy was recommended. Instead, the patient was treated by a radiation therapist who administered 2,100 r (200 kv.) to the tumor June 14 to July 22. According to the patient, there was a moderate speed-up in growth of the mass immediately after irradiation (Fig. 12, left). Growth was arrested eventually and regeneration of bone was followed roentgenographically at irregular intervals thereafter. By 1953, replacement of the tumor by bone had occurred (Fig. 12, right). The patient was put on annual recall.

SUMMARY AND CONCLUSIONS

In the differential diagnosis of giant cell tumors of the jaws, a possibility of confusion exists between the giant cell tumors of the jaws and the jaw lesions resulting from, or associated with, hyperparathyroidism. Dependable differential diagnosis between these two types of giant cell tumors can be made only with adequate blood chemistry examination.

Giant cell tumors of the jaws unrelated to hyperparathyroidism are best treated by thorough enucleation and curettage. In instances of hyperparathyroidism, removal of the parathyroid adenoma leads to disappearance of the bone lesions.

Cases of giant cell tumor of the jawbones are reported as examples of problems in differential diagnosis and management.

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Psychological factors in dental disorders: a comprehensive approach

Bernard Saper, Ph.D., Chicago

The modern dentist is doubtless familiar with the term psychosomatic in the discipline of medicine. Essentially it refers to the psychogenic basis of many physical disorders. The term as such is recent, and is in part a reaction to the somatopsychic approach to medicine which for two centuries has underscored the psychological effects of bodily disorders. Thus, pain, discomfort and physical illness were seen to cause irritability, unhappiness, anxiety and other dysphoric feelings. There is abundant evidence, however, that the situation may be the reverse. Feelings, motives, and attitudes—of which the individual may or may not be aware—can and do cause drastic changes in body structure and body function. It is not unusual to hear pediatricians, gynecologists, internists and skin specialists talk like psychologists and psychiatrists.

Since the terms psychosomatic and somatopsychic suggest an artificial duality between mind and body, in which the one has an apparently irreversible effect on the other, their use is unfortunate. In reality the emphasis should be on the behavior of the whole person. The emphasis should be on the interaction, the interrelation, the covariation of the two elements of these terms, so that the primacy of one over the other ceases to exist except in terms of the professional predilections of a particular scientific discipline. What each discipline chooses to study, to understand and control, or to treat is only a facet of a multi-faceted whole person.

Naturally, because dentists are frequently more human than scientist, they tend to behave as if that facet which falls within their professional purview is the most important, or even the only one. The inadequacy of such a professional attitude has already been recognized by some circles of the medical profession. The term medical psychology is becoming more fashionable these days than psychosomatic medicine, and it is intended to be broader and to include a wider variety of interactions. This term is not much improvement over the older one, however, because it retains the suggestion of duality, and neglects the contributions of such other disciplines as anthropology, sociology and guidance.

A more recent term, comprehensive medicine, has been suggested.[1] This term seems more in keeping with the current vogue in medical thinking, with the basic premise of a multifaceted whole person, and with research evidence bearing on the interaction of mental, social and physiological processes in causing illness.

COMPREHENSIVE MEDICINE

In comprehensive medicine, illness is looked at in the following way. An individual of a certain make-up is subjected

Director, Adult Counseling Center, and assistant professor of psychology, Northwestern University.

1. Saslow, G.; Guze, S. B., and Matarazzo, J. D. Psychosomatic medicine and the psychologist. In Introduction to clinical psychology, Pennington, L. A., and Berg, I. A., editors, ed. 2. New York, Ronald Press, 1954.

to a stress situation. This causes physiological and structural changes, some of which function as modifications in psychological tensions and feelings, and all of which are medically manifested as signs and symptoms. The comprehensiveness comes in with the manifold interactions and the breadth with which the terms are defined. Stress, for example, includes infectious agents, chemical agents, physical trauma, allergens, roentgen-ray irradiation, starvation, conflict, frustration and changes in climate. That all of these diverse factors can be subsumed scientifically under one heading has been amply and ingeniously demonstrated, mainly through the research of Hans Selye and his co-workers[2] on the adaptation syndrome.

Signs and symptoms would include physiological, structural and psychological changes in the patient, and it is as legitimate to employ psychological tests as it is to employ the usual medical laboratory tests in the detection of these difficulties. Among the modifications of psychological tensions would be changes in attitudes about going to see a doctor, deciding to change a job and getting along with others.

COMPREHENSIVE DENTISTRY

Analogous to comprehensive medicine, comprehensive dentistry would appear to be a more dynamic, more extensive, and more productive approach to the patient with dental problems than the traditional practice of dentistry. With this approach dental distress is regarded as a clinical symptom displayed in a complexity of other symptoms which in the past have been studiously ignored, even denied, by the busy dental practitioner. Comprehensive dentistry points up the totality of the life stress situation, in which exist psychological sources of dental pain and discomfort that should be recognized, if not respected, with determined seriousness by the dentist.

Pain • The psychological aspect may be enlarged by specific reference to dental pain. The patient tells the dentist that his jaw aches, his tooth aches or that he has a sharp pain in his temporomandibular joint. In evaluating this pain, the dentist must draw on a whole background of knowledge about the subject. As a practitioner, he is not much concerned with either of the two current theories of pain: the excessive stimulation mediated by any sensory nerve theory versus the special pain receptor theory. Instead, he considers the type of pain.

Superficial pain is bright, intense, pricking and localizable, whereas deep pain has a diffuse and aching quality. On further exploration, the dentist will find either an inflamed pulp causing excessive stimulation of the nerve fibers, or injured periodontal tissue, exposed dentin, dry socket, or a number of physical reasons. The search ends, the diagnosis is made, and the dentist will proceed to eliminate the irritation, extract the tooth, administer drugs, or employ other treatment methods. He collects his fee, happy with a job well done. In terms of the traditional approach to dental pain, treatment has been undeniably adequate.

But what about the patient? To be sure, his pain was relieved and that is what he came for. Nevertheless, the dentist knows that the experience of pain is purely subjective. Pain results when a naked nerve ending is exposed to intense environmental life stress. According to the comprehensive approach to dentistry, this would mean that intense mechanical, chemical, thermal, electrical and psychological stimuli act on the individual singly or in combination to cause pain. Strong feeling such as anger, fear, guilt and anxiety would therefore be important variables to be considered in evaluation of pain. Charles G. Maurice[3] has said,

2. Selye, H. Story of the adaptation syndrome. Montreal, Acta, Inc, 1952.

3. Maurice, C. G. Differential diagnosis of dental pain. J.A.D.A. 50:316 March 1955.

It is common knowledge that an injury which in one individual may produce slight discomfort, will in another who is emotionally conditioned produce excruciating pain. The exaggerated reaction is due primarily to psychic factors and is termed psychoneurotic pain.

Fear • When a dentist looks into a mouth, how much of his patient does he see? Does he consider the fact that the patient's fear might intensify pain; that the muscle tension observed may result from anxious, tense feelings, and that muscle tension can cause, not merely exaggerate facial pain; or the fact that the dentist may cause all sorts of apprehensions and anxieties which will increase pain? The dentist may interpret changes in the patient's pulse rate, sweating, nausea and apparent changes in blood pressure as reactions to severe pain. But has he considered that conflict, anxiety and anger can be reflected in the same physiological changes? There is available some evidence that dentists are beginning to appreciate the value of this broader approach.[4]

Relaxation • How many dentists in their daily practice can recall telling a patient something like "that tooth should not be hurting you any longer, it is all in your imagination," or "relax, this drilling will not hurt, you have nothing to worry about"? The fact is that so called "imagined" pain hurts just as much as pure or real pain. Relaxation is a predisposition to behave calmly, tranquilly and objectively, and as such it is a psychological attitude, not a controlled physical act.

PATIENT REACTION

The surgical and medical regimen in current dentistry has neglected the total, integrated individual's reactions—especially his feelings about tolerating pain, his need for assurance and understanding while under dental care, his wish to be treated like an important person, not merely a receptacle for clever and sometimes weird gadgets which have become the professional trappings of the modern dentist.

Although a thorough analysis of the complex interaction between psychological and physiological factors is beyond the scope of this discussion, it would seem desirable to consider, briefly at least, just how these are related in general.

Etiological and treatment processes will be discussed separately. Each of these processes will serve as foundation for evaluating some pertinent research data and for developing the thesis that a comprehensive approach to dentistry must acknowledge the influence of psychological and emotional factors in dental disturbances.

Stress Agents • As mentioned earlier, the term stress may include such apparently unrelated agents as bacterial infection, injury, allergens, conflict, frustration, fear or anxiety. Selye demonstrated in a number of experiments done over the past 20 years that any one or a combination of these stress agents can set up a reaction in the individual which is at the same time specific to the agent (for example, fever is specific to bacterial infection; pain, tissue damage and blood changes are specific to injury), and a general response superimposed on all these specific effects. The initial stage of this general stress syndrome is the alarm reaction, which is a momentary readiness for "flight or fight" with the particular stress agent, and always is accompanied by adrenal cortex hyperactivity. When stress is mild, the alarm reaction may be manifested in tension or excitement. But, when the stress is intense and prolonged, this reaction may actually create tissue changes in the body as well as depress the activity of the central nervous system.

The next stage of the general stress is

4. Raginsky, B. B. Psychosomatic dentistry. J. Canad. D.A. 20:479 Sept. 1954.

one in which the person has adapted himself optimally to the stress agent. The manifestations of the initial alarm stage disappear, but autonomic nervous system activity—namely, sympathetic and parasympathetic tonus or firing—persists. The result is that the individual is resistant to the original evocative stimuli, but he becomes vulnerable to other stimuli. It is this cross-stress effect that is crucial to an understanding of the psychosomatic disorders. The final stage in this syndrome is when the acquired adaptation is lost again. According to Selye, psychological stress agents are especially important.

Psychological Stress • What happens in the case of psychological stress? At the time a particular stress—physical or psychological—impinges on a person, he has certain reaction sensitivities to begin with. These sensitivities are contributed to by his heredity, his up-bringing, his temperament, his culture and the products of his previous relations with other people. These sensitivities provide each person with a readiness to react, and sometimes are residuals of previous stress situations. When an event is interpreted by the individual as threatening (whether it really is so or not does not matter), it is experienced as stressful. Certain types of conflict are extremely threatening. Frustrations are threatening; anticipation of unwelcome punishment is threatening; such feelings as guilt, hate, dependence, anger and insecurity are threatening. Threat creates tension, anxiety, and distortion or impoverishment of ongoing behavior.

Physiological Stress • On the physiological side, first the sympathetic nervous system, then the parasympathetic, and then both together are firing uncontrollably and persistently, causing primarily visceral and glandular dysfunction. Increased muscle tonus and the stretching of tissue around expanding blood vessels that are autonomically innervated can exert pressure on nerve endings and cause pain. On the psychological side, anxiety and tension are experienced as a preliminary, impending phase of emotional excitement. This excitement is usually described as dread, fear, apprehension, jumpiness, restlessness. The individual cannot bear to be in this state of disequilibrium, so he frequently automatically blocks out of his awareness those stimuli which threatened him and set up the stress reaction in the first place. But even though these threats are, so to speak, put out of his mind—and he finds himself in the stage of optimal adaptation—his autonomic nervous system continues firing and he remains vulnerable to other stress agents.

There are various theories that attempt to account for the unique relationship between psychological stress and particular organic disturbances. One theory, advanced by Flanders Dunbar,[5] is that individuals of specific personality characteristics, when subject to prolonged stress, tend to succumb to particular physical disturbances. In this way, she has attempted to relate diabetes, cardiovascular disease, rheumatoid arthritis to specific personality types.

Another theory, the chief exponent of which is Franz Alexander,[6] says that specific emotional or psychological difficulties cause specific patterns of autonomic firing and these cause, in turn, specific organic disturbances. For example, the conflict between dependence and independence in adults leads to a blocking of the wish to be taken care of; however, since being taken care of is equated with being fed, and being fed touches off a parasympathetic discharge, the prolonged activity of this branch of the autonomic nervous system results in stomach hyper-

5. Dunbar, H. F. Emotions and bodily changes; a survey of literature on psychosomatic interrelationships, 1910-1945, ed. 3. New York, Columbia University Press, 1946.

6. Alexander, Franz. Psychosomatic medicine; its principles and applications. New York, W. W. Norton & Co., 1950.

acidity, blanching, excessive motility and, finally, the formation of ulcers. In a similar manner asthma, essential hypertension, headaches, constipation, colitis, and so on are explained. There are other theories; all theories currently advanced have some small merit, but none can account adequately for all of the diverse clinical evidence and experimental results.

PSYCHOGENIC ORAL PAIN

With this brief sketch of the relationship between psychological source and physical manifestation as context, what can be said of the unique dental problems met in daily practice? If the psychogenic origin of some forms of backache, headache and chest pain is tenable, then the psychogenic origin of some forms of toothache should also be tenable. Psychological factors as such have not yet been found to cause toothache directly, invariably and specifically, but certainly they have been found to contribute greatly to the tooth pain, whatever its other specific causes.

Maurice,[3] in discussing the differential diagnosis of dental pain, emphasizes that "in a particular real life condition, the total pain experience of an individual is noticeably influenced by his emotional state." The implication here is that whatever the source of pain—pulpal, periodontal, osteal—this pain still may be intensified by psychic factors. Fear and anxiety in the patient have the effect of increasing his tooth pain.

The matter of facial pain and pain in the temporomandibular joint is more clear cut. There is no doubt that such pain can be, and frequently is, psychogenic. Psychologists and psychiatrists have known this for some time. Psychic stress such as has been described can eventuate in increased muscle tension, and this tension can cause facial pain and temporomandibular joint dysfunction.

Copland[7] found this to be the case in his analysis of 80 unselected patients with temporomandibular joint dysfunction. His study included 56 women and 24 men. Previous investigators had implicated such physical sources as malocclusion, inflammation, trauma and arthritis as causing the disorder. Nevertheless, in his study, in 19 instances (14 women and 5 men) the conditions were due exclusively and entirely to abnormal muscle tension, and 45 (over half) were due to abnormal muscle tension in combination with other causes. He concludes, "[M]uscle tension may be a result of an existing predisposition or it may be related to emotional disturbances or mental anxieties to which the individual is temporarily subjected."

Miller[8] has recognized that bruxism may result from nervousness. Recently Vernallis[9] studied 40 persons who ground their teeth to determine the extent to which this dental syndrome is related to the psychological factors of anxiety, hostility and hyperactivity. He found, through psychological testing of these subjects and their matched controls, that the three psychological factors are significantly and positively related to bruxism. These findings suggest that the dentist could use the presence of bruxism at least as a reliable clue to the presence of underlying tension in his patient.

There would appear to be no doubt that tooth pain, temporomandibular joint pain, bruxism and periodontal difficulties are intensified by psychological or emotional factors. In some instances, as in the instances of temporomandibular joint dysfunction reported by Copland, psychological difficulties have been directly implicated as causes.

Do these findings and the general principles of comprehensive dentistry suggest

7. Copland, J. Abnormal muscle tension and the mandibular joint. D. Record 74:331 Dec. 1954.

8. Miller, S. Textbook of periodontia, ed. 3. Philadelphia, Blakiston Co., 1950.

9. Vernallis, F. F. Teeth-grinding: some relationships to anxiety, hostility, and hyperactivity. J. Clinical Psychology 11(4):389 Oct. 1955.

that the dentist become a psychologist, and beyond that a psychotherapist or psychological counselor? Not any more than the recognition of an inflammatory process in the throat and mouth of the dental patient would impel him to relinquish his dental forceps and take up the physician's stethoscope. They merely point up the desirability of taking into account the whole person—including his conflicts, frustrations, anxieties and tensions—when dealing with the dental patient. They urge that some of these psychological disturbances be brought into the treatment regimen, either by the dentist himself or by referral to a psychiatrist or psychologist. Despite the fact that 25 per cent of Copland's patients had disturbances relating entirely to abnormal muscle tension caused by psychological difficulties, he used gadgets, finger massage and other exercises to treat the condition. He did nothing, however, to handle—either directly or through referral—the underlying emotional disturbance.

Aside from the possibility of referral, which obviously is not feasible in a great many instances even when the dentist recognizes the psychological factors operating to cause, prolong or enhance the patient's distress, there are several adjunctive treatment approaches that might be considered once the role played by these factors is accepted. Coupled with the traditionally indicated modes of handling the actual dental disorder itself, there are both drugs and interviews which would appear to be useful.

TRANQUILIZING TECHNICS

Drugs • The so-called "tranquilizer" drugs, like chlorpromazine and reserpine, have been used in a variety of neuropsychiatric and psychosomatic disorders with noteworthy results.[10] They have been of considerable value in reducing stress, tension, anxiety, nervousness and other dysphoric psychological states. They might possibly be used (after appropriate research has indicated they are suitable) to calm and relax the patient, to make him more amenable to the general physical forms of dental treatment. It should be emphasized that the use of such drugs is not without dangers and may require more medical knowledge than the average dentist currently possesses.

Interview • The interview obviously would be brief and secondary to the important business of relieving the patient of his physical distress. It may take two forms: general conversation and hypnosis.

Hypnosis • Hypnosis has been used by dentists for many years.[11-13] As a specialized psychological technic, stripped of hocus-pocus and ethically applied, hypnosis has proved its value in a considerable number of instances. There are an estimated 2,000 dentists who have used some form of hypnosis on over 70,000 patients for a variety of purposes, including preparation (helping the patient to assume a wholesome psychological attitude) for dental surgery, anesthesia or analgesia, and assurance for postoperative comfort. They have used hypnosis in the treatment of malocclusion, abrasion and facial neuralgia—the same type of disorder studies by Copland. Hypnosis has been used in the management of bruxism. Secter and Heron[14] report the use of hypnosis in treating with some success an instance of temporomandibular joint dysfunction. The patient, a 45 year old nurse, had been suffering pain and loss of joint motion, with only brief

10. Miner, R. W., editor. Reserpine in the treatment of neuropsychiatric, neurological, and related clinical problems. Ann. New York Acad. Sciences 61:1 April 15, 1955.

11. Ament, Phillip. Stress removal in dental practice with hypnodontics. J.D. Med. 7:114 Oct. 1952.

12. Heron, W. T. Hypnosis and psychology in patient control. J. Michigan D.A. 35:131 June 1953.

13. Burgess, T. O. How to approach the apprehensive patient. J. Am. Soc. Psychosomatic Den. 1:17 Oct. 1954.

14. Secter, I. I., and Heron, W. T. Hypnotherapy for relief of pain. D. Items Interest 75:391 April 1953.

periods of remission, for ten years. Their conclusions are particularly pertinent:

> Since many such cases first present themselves to the dentist, it is the responsibility of the dentist to see to it that in those cases where there is no obvious organic involvement, the possibility of psychogenic etiology should be thoroughly explored before doing surgery in the blind hope that the case may receive relief.
>
> Hypnotic suggestion can frequently be used to overcome conditions which are functional in nature and do not deserve surgical treatment.

Although the psychological technic of hypnosis would seem to warrant inclusion in the dentist's armamentarium of treatment methods, it nevertheless is no panacea. It has its indications and limitations, its uses and misuses. The dentist who decides to use it will doubtless need to consider these.

General Conversation • Probably the most satisfactory type of interview is the brief general conversation between dentist and patient. This conversation is designed to demonstrate to the patient that the dentist accepts, understands and sympathizes with his difficulties. The patient is soothed, calmed, helped to relax. An atmosphere of mutual respect, warmth and confidence is created. Assurance, support and reflection of the patient's feelings sustain such an atmosphere. In general, the interview has the purpose of reducing tension and anxiety. Such an approach has recently been recommended by Weisengreen[15] in the management of facial pain, and by Raginsky[16] in the preparation of the dental patient for anesthesia. Soft music has also been suggested as a device for reducing fear, pain and reflex irritability in order to render the patient psychologically amenable to oral surgery.[17]

If time is taken to reduce the patient's fear, anxiety, and tension, the total stress situation is lessened. This in turn will increase his comfort, lessen his pain, and assure him that he counts as a person. What is more, the dentist becomes more of a human being to the patient.

COMMENT

Under no circumstances should the foregoing discussion be construed as a lack of appreciation of the proved value of considering the physical factors in dental illness. Dentistry is, after all, theoretically and practically rooted in such an approach, and it will doubtless continue to emphasize it. Moreover, it would be contrary to the principles of comprehensive dentistry and its emphasis on the total person to suggest that the psychological approach alone constitutes a sufficient and satisfactory regimen for the patient. There is obviously more to a toothache than feelings and attitudes.

Psychology, nevertheless, would appear to have a legitimate role in both the etiological and management aspect of dental illness. In dealing with his patient comprehensively, it is important for the dentist to recognize the function of stress and personality make-up in causing or aggravating discomfort. There are several psychological methods useful in obtunding pain, allaying fear and anxiety, and otherwise enhancing the mental and physical well-being of the dental patient.

15. Weisengreen, H. H., and others. Approach to the problem of facial pain. J.A.D.A. 48:33 Jan. 1954.

16. Raginsky, B. B. Preanesthetic management of the dental patient. J.A.D.A. 49:672 Dec. 1954.

17. Seybold, J. W. Music as an aid in oral surgery (Abst.). J.A.D.A. 46:732 June 1953.

The responsibility of the patient in the treatment of periodontal disease

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The patient's cooperation in home care is the most important phase in periodontal treatment. Periodontists estimate that home care by the patient is responsible for from 50 per cent to 90 per cent of the success of the treatment.

Periodontal literature contains many statements regarding the value of brushing, massage and stimulation. These statements are notable for their lack of controlled experimental evidence. It is unnecessary, however, to prove the value of massage and cleanliness in periodontal treatment. Clinical evidence obtained by numerous dentists in many years of observation and experience has shown the value of these treatments. When the patient neglects either massage or cleanliness, the treatment fails.

The dentist, like the physician, is prone to gamble on probabilities. Every day the dentist is called on to make decisions about the advisability of treatment; such decisions are based on calculated risks involving the skill and knowledge of the operator, the condition of the patient, and his probable response to treatment. The periodontist feels justified in using every resource at his command to secure the desired results.

The best resource at his command is a well-trained, cooperative patient. The dentist who is successful in periodontal treatment must be as capable a teacher as he is an operator. He must have infinite patience to teach the patient over and over again, from visit to visit, until the patient has mastered the lessons.

Most patients have the erroneous idea that pastes, powders and mouthwashes are almost as effective as some of the so-called "wonder drugs" are supposed to be. The quickest way to correct the patient's thinking on this point is to advise against the use of pastes and powders. The patient should be advised to use salt water or soda water—not salt or soda—as a dentifrice. He will discover that it will take him three to five minutes to do what he thought he was accomplishing in 15 seconds. The pleasant-tasting ingredients in pastes and powders lull the patient into a false sense of complacency. Pastes and powders have no therapeutic value other than cleanliness, and they induce the patient to do a quick job which achieves little cleaning and no massaging.

One of the great problems in getting a patient to cooperate in periodontal treatment is to persuade him that the relatively time-consuming and tedious exercises are important enough to warrant their use. After a patient has endured the discomforts of a gingival resection, it would seem that it would be easy to convince him that any amount of care to avert or delay further treatment would

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be worthwhile. Actually, a large percentage of patients never give their mouths adequate care, despite the training they receive, the way in which the importance of maintenance is dramatized, and the experience of the treatment. Some people have been indoctrinated for so long with the idea that eventually they must lose their teeth that at times it appears as though they were anxious to "get it over with."

There is some question as to the advisability of periodontal treatment for the patient whose oral condition indicates that he does not practice any oral hygiene. It is doubtful, however, that the practitioner is justified in discouraging this type of patient from receiving treatment. In a large percentage of patients of this kind, a reformation occurs; these people become exceedingly cooperative and eager patients. Even if the transition to good oral hygiene does not occur, it is still worthwhile to render periodontal treatment. It may have taken many years for the mouth of the noncooperative patient to reach its present poor condition. If, through treatment, a greatly improved condition of the mouth can be attained, the teeth may be saved for an appreciably longer period.

After periodontal treatment has been completed, the next consideration is the maintenance phase of treatment.[1] The burden now shifts from the dentist to the patient. Prior to this point, the dentist supplied the knowledge, skill, instruments, dressings and the operative procedure. Now, after a course of instruction from the periodontist, the patient must take over.

The value of home care in periodontal treatment has been emphasized repeatedly, beginning with the writings of Josiah Flagg and, later, Delos D. Smith. Flagg was the first to use the term "gum brush" instead of "toothbrush," thereby placing the emphasis where it should be. The term "toothbrush" should never be used by the dentist in instructing the patient. If this term is used, the patient is likely to get an erroneous idea of the brush's use. If the patient thinks of it as a toothbrush, he will begin and end its application on teeth. If he thinks of it as a gum brush, he will begin his part of the treatment on the gums. If the patient institutes proper gingival massage, he can hardly avoid doing a good job of cleaning the teeth. The converse is not true; the patient can do an acceptable job of cleaning the teeth with little or no gingival massage.

VALUE OF MASSAGE

Next to sympathy, massage is the oldest known medical remedy. It should be performed to the degree of stimulation but not to the point of irritation. Massage is the method by which man attempts to compensate for masticatory functions lost through his so-called "advances" toward becoming civilized. The more civilized man becomes, the more functions he dispenses with; mastication is one such function. Blood must be brought to and from the gingiva to keep the periodontal lifeline open. Massage is the means by which this is accomplished.

The importance of home care generally is conceded by the profession. The most common method of massaging the gingivae and cleaning the teeth is by use of the brush.

The selection of the proper brush is important. The two types of brushes that have attained most favor today are the natural bristle brush with two or three rows, with six tufts on each row, and the soft nylon multitufted brush.

Several technics of brushing are available—Stillman,[2] modified Stillman, Charter, Fones or physiologic. All have the same objectives—to promote good oral

1. Chace, Richard. Maintenance phase of periodontal therapy. J. Periodont. 22:234 Oct. 1951.

2. Leonard, H. J. Home technics for the care of the teeth. J. Periodont. 20:27 Jan. 1949.

hygiene, to stimulate and increase the circulation, improve keratinization, and to maintain healthy, stippled, pink gingivae with a shallow gingival sulcus.

It is the dentist's responsibility to select the proper brush for each patient. Instruction is begun on models, but the proving ground for correct brushing of the gingiva and teeth is in the patient's mouth. Under the supervision of the dentist the patient must brush the gingiva and teeth again and again, until he has mastered the technic.

Auxiliary aids in maintaining oral hygiene are the soft, cone-shaped rubber stimulator (preferably attached to the brush in order to prevent an accumulation of gadgets), and round toothpicks, dental floss, dental tape and triangular-shaped wood points.[3] Careful instruction is given the patient in the use of the aids selected, in order to prevent injury to the gingivae; the patient in turn demonstrates their practical application in his mouth. The rubber stimulator and the triangular-shaped wood points are especially helpful where the interdental spaces are large; smaller spaces, with the papillae intact, may require the use of floss or tape. Wood points should not be forced into interproximal regions with enough force to cause buckling. Round toothpicks are used for the same purpose as wood points but have the disadvantage of being extremely hard and of not being triangular to fit the interdental spaces.

The patient with periodontal disease must understand and be able to perform the physiotherapy outlined by the dentist, without injury to the gingivae. He must understand the need for keeping to the exact schedule of home care, and that care of the gingivae is much more time-consuming than his former efforts at toothbrushing. The patient must use good brushes, which must be changed frequently and on a schedule. Brushes must be kept clean by being rinsed in cool water and hung up to dry, preferably in sunlight, and must be alternated in use so that the bristles are always dry. In any situation where it is impossible for the patient to brush the gingivae and teeth after eating, he will find it beneficial to rinse the mouth vigorously with tap water for five minutes.[4]

Patients often lapse into old habits after periodontal treatment, especially in the absence of unpleasant symptoms. When the patient calls again, it is good procedure to have him bring the old brushes as well as the new to the office for inspection. This will often reveal poor brushing on demonstration by the patient, poor care of the brushes, and evidence of lack of regularity in their use. A new course in brushing should be instituted for this patient. Return visits for prophylaxis and recall of patients treated for periodontal disease should be based on the willingness and the ability of the patient to maintain home care. Some persons necessarily will be on short recall, whereas others may go for a period of six months to a year.

ROENTGENOGRAMS

In instances of advanced periodontal disease, full-mouth roentgenograms should be made every 12 months. A patient should never go for longer than 24 months without a full-mouth roentgenographic survey. Interproximal roentgenograms should be taken after every prophylaxis. The patient should receive an explanation of why this is necessary and should be urged to cooperate. In instances of periodontal disease, however, a diagnosis based only on roentgenograms is of almost no value. The color of the gingivae, pocket depth, mobility and occlusal findings do not show in roentgenograms. The roentgenogram, although indispensable, is an aid only. It is a tragedy to condemn periodontally involved

3. Beube, F. E. Periodontology; diagnosis and treatment. New York, Macmillan Co., 1953, p. 242-248.

4. Bell, D. G. Teaching home care to the patient. J. Periodont. 19:140 Oct. 1948.

teeth from roentgenographic observations alone.

Harmful habits and compulsions, such as bruxism, clenching and tongue-thrusting, with their deleterious effects, should be avoided. The patient should be warned of their dangers.

DIET

The patient with periodontal disease should be encouraged to follow a well-balanced diet, although research has not revealed a direct connection between periodontal disease and dietary deficiencies.[5] Scurvy is the possible exception to this statement. It is assumed, however, that natural repair and resistance of the periodontium will be greater in the well-nourished person. Therefore, since caries may be associated with refined sugars and carbohydrates or the absence of fluorine in the drinking water; since a soft diet furnishes a minimum of stimulation and of cleansing action, and since being overweight is a common physical condition for the average American, it seems prudent to recommend to the patient a low-calorie, high-vitamin, high-mineral diet.

GUIDING THE PATIENT

The patient shares great responsibility after periodontal treatment. Home care must be meticulous and massage of the gingivae is of paramount importance. The dentist is now a teacher and adviser who aids the patient, but the latter actually must carry out most of the treatment. The prognosis depends on the home care and the extent to which the patient follows all the instruction given by the dentist.

The patient must carry out several treatments at home each day. The dentist must carry out the necessary number of treatments each year. Dentist and patient must cooperate.

The treatment of periodontal disease is not complex; it is simple. Unfortunately, some attempt to make the subject complex. The diagnosis and treatment of periodontal disease is a challenge to the dental profession. This challenge must, and can, be met by the practitioners of dentistry. There are not enough periodontists in the United States to treat the periodontal conditions found in the City of San Francisco alone.

The dentist who achieves a high percentage of success in the treatment of periodontal disease must be a teacher at the chair, before, during and after treatment. The dentist must not make complex what is really simple in teaching the patient his responsibility. An overtaught patient and too many gadgets are likely to defeat the purpose of the teaching.

Professional interpretations of periodontal observations often are meaningless. The dentist can become so engrossed in looking into test tubes and through microscopes that he almost forgets to look into the patient's mouth. The overuse of photomicrographs and laboratory findings, and high-sounding theories, are the quickest way to doom the patient to loss of his teeth. Periodontal research is of no value unless it can be proved in the mouth.

COMMENT

An unfortunate aspect of periodontal disease is that it is seldom accompanied by pain. Pain is a warning of danger. When the patient is told that he has this disease, sometimes he becomes panicky and often is ready to have some treatment that is foolish or impractical. He must be warned of the many nostrums, medicinal and mechanical.

There are no new, spectacular or dramatic treatment procedures. Subgingival curettage and gingival resection and

5. In our opinion. J. Periodont. 20:132 Oct. 1949.

cooperation of the patient are the foundations in the treatment of periodontal disease.

Penicillin has no place in the treatment of periodontal disease. Excessive splinting is not to be condoned. Gold therapy seldom is indicated, but dentists often use it because their training in dental school was principally mechanical. Dentists, unfortunately, are not therapy-minded. The quick, mechanical successes achieved in other fields of dentistry will not work in periodontics. The dentist must have patience to wait, for biologic and physiologic responses to periodontal treatment cannot be hurried.

A rim of shiny gold jewelry lacing the tops of the teeth may be attractive to the patient. He may value it highly, not because he can judge whether it is good or bad but because it cost him a lot of money.

Expensive splinting, except in rare instances, seldom is indicated. Splinting functions best in the mouth where the periodontium is normal. A normal mouth should not be treated in any manner.

For too long dentists have worshipped at the feet of a mechanical god. Although prosthetic appliances are much better than no teeth at all, at best they are only about 20 per cent as good as was the normal dentition. The periodontal patient who has been treated with prosthetic appliances usually ends up disgusted with dentistry, exhausted financially and ready for Uncle Sam to take over.

Thanks to the contributions to the understanding and treatment of periodontal disease made by three great leaders —John M. Riggs, Delos D. Smith and Edward B. Spalding—the dentist's obligation to the public can be fulfilled. It is the dentist's duty to see that the tragic loss of teeth because of periodontal disease does not occur. The knowledge and equipment to meet these responsibilities are at hand. With care and study the problem can be met and solved.

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Goodness Doesn't Just Happen • It is necessary for the health of the world that every man shall be able to say and do what he wishes and what is within his power. Man must understand life if he wants to master it. Each human being has a unique contribution to make toward his understanding of life, because every man is unique. His physical and mental make-up is unique, his circumstances are unique. Each man, therefore, must know things which are known to nobody else. He must be able to tell us something that could not be learned from any other source.

If a man says or does what he likes, however, there comes a point when he wants to say or do something which interferes with the liberty of a fellow man to say or do what he likes.

The main problem of life is the balancing of competitive freedom. This involves a series of delicate calculations, and man should never stop making them.

Horrors are committed by human beings like me and you. What is good on this earth does not happen as matter of course, it has to be created, it has to be maintained, by the effort of love, by submission to the Rule of Law. But how are we to manage to love, being so given to cruelty? How do we preserve the law from being corrupted by our corruption, since this is a human institution?

It is not easy but if we want life to be easy, we should have gotten born on a different universe. *Rebecca West. The Thinking Reed.*

Recent nutritional concepts in relation to dental health

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The ten years which have elapsed since World War II have seen a great improvement in man's understanding and appreciation of nutrition principles. This has been particularly so in the field of dentistry.

A discussion of nutritional principles leads to a consideration of the role in body metabolism of the micronutrients, the macronutrients, and trace elements. In addition to nutritional requirements for good oral health, consideration of essential nutrient intake is important. Other factors are the proportion of food components in the diet—especially an excess of carbohydrate, heredity, acid-producing bacteria, proteolytic enzymes, plaques, saliva, fluoride and oxalate effect, texture of diet, season and geographic location, social status, and the endocrines.

The influence of diet and nutrition on periodontal tissues is a debated subject.[1] Some investigators maintain that vitamin C deficiency is associated with gingival hemorrhage, resorption of bone and detachment of the periodontal membrane from the alveolar bone. Others have found little correlation between plasma ascorbic acid levels and occurrence of gingivitis. The latter investigators have not encouraged vitamin C therapy as a corrective measure. Chilton[2] concludes that perhaps the principal reason for the conflicting opinions is that in many instances carefully controlled clinical studies have not been conducted. He indicates that subclinical nutritional deficiency may be a predisposing factor in diseases of the periodontium, and that one should not look for the so-called "all or none reaction" in which the patient's scurvy responds overnight to vitamin C therapy.

Beube[3] infers that substandard diets do not have any specific deleterious effect on diseases of the gingiva or the periodontium. Nevertheless, he leaves the reader with the impression that nutrition plays a part in the etiology and therapy of marginal gingivitis and periodontitis.

The periodontal tissue, like other body tissues, definitely requires essential nutrients, and subclinical malnutrition will lower the so-called resistance of the periodontium which eventually will result in the development of diseased tissues. Simonton[4] has shown that periodontal degradation occurs in dogs where the mineral intake is low.

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1. Schour, Isaac, and Massler, Maury. Effects of dietary deficiencies upon the oral structures. II. III. J.A.D.A. 32:714 June; 32:871 July; 32:1022 Aug.; 32:1139 Sept. 1945.

2. Chilton, N. W. Nutritional aspects of periodontal therapeutics. J.A.D.A. 43:583 Nov. 1951.

3. Beube, Frank E. Periodontology: diagnosis and treatment. New York, The Macmillan Co., 1953, Chap. 22.

4. Simonton, F. V., and Jones, Martha R. Mineral metabolism in relation to alveolar atrophy in dogs. J.A.D.A. 15:881 May 1928.

PERIODONTAL DISEASE: PREDISPOSING FACTORS

It may be well, in a short article, to confine a discussion of this broad topic to the following subjects: (1) calcium-phosphorus metabolism and bone resorption, and the influence of the parathyroid glands; (2) the action of enzymes in dentinogenesis; (3) relation of formed chemical compounds to periodontitis; (4) occlusal trauma; (5) nutritional deficiencies, and (6) physical character of the diet.

There is no doubt that resorption or atrophy of the alveolar bone is involved in advanced stages of periodontal disease, and it is apparent that calcium and phosphorus metabolism are directly associated with this condition. Little mention is made of the influence of the parathyroid glands on the calcification or resorption of the bony structures of the oral cavity. Excessive amounts of parathyroid hormone will cause a breakdown of bone since a potent substance is present that acts directly on bone.[5] Weinmann and Sicher[6] state, however, that "decalcification (halisteresis) of the living bone has never been proved and it seems certain that it does not take place." These authors believe "the calcium salts, liberated through removal of the organic compounds of the intercellular substance, may be made soluble by the action of chelating substances produced by the osteoclasts." They maintain that the local acidity cannot rise to high enough pH to cause decalcification.

McLean and Urist[7] do not use the term decalcification except when referring to laboratory procedures for histologic purposes, but they assume "that the bone salt may be dissolved whenever another substance with a stronger affinity for calcium is in a solution in contact with bone." They further state that it is unknown how a needed enzyme can dissolve inorganic salts, but they assume that instead of acid, chelating agents may be the factors.[8] Sreebny and Nikiforuk[9] speak of demineralization of hard tissues by organic chelating agents. Although it seems that the various authors are quite far apart with respect to destruction, solution, resorption, or decalcification of bone, clarification of their definitions of terms may narrow these differences.

An animal on a starvation regimen deficient in minerals and vitamins will show extensive bone resorption (hunger osteopathy). In studies on rats, Norman and Mittler[10] show that high calcium diet inhibits bone resorption, and that there is a relationship between vitamin D and sex hormones and calcium and phosphorus metabolism.

The endocrine factors are known to be influenced by diet. If a diet, for example, is adequate in utilizable calcium such as that from milk, the deteriorating effect of hyperparathyroidism is much less evident.[11]

Recent work indicates that collagen-splitting enzymes and depolymerizing enzymes are associated with bone resorption. Alkaline phosphatase present in osseous tissue has been localized in dental tissues.[12] This enzyme plays an important role in calcification by increasing the concentration of inorganic phosphate and calcium ions and by the prevention of absorption of ester phosphate. The latter would be

5. Albright, Fuller, and Reifenstein, E. C. Parathyroid glands and metabolic bone disease; selected studies. Baltimore, Williams & Wilkins Co., 1948.

6. Weinmann, J. P., and Sicher, Harry. Bone and bones, ed. 2. St. Louis, C. V. Mosby Co., 1955, p. 25.

7. McLean, F. C., and Urist, M. R. Bone; an introduction to the physiology of skeletal tissue. Chicago, University of Chicago Press, 1955, p. 66.

8. McLean, F. C., and Urist, M. R. Bone; an introduction to the physiology of skeletal tissue. Chicago, University of Chicago Press, 1955, p. 71.

9. Sreebny, L. N., and Nikiforuk, G. Demineralization of hard tissues by organic chelating agents. Science 113:560 May 11, 1951.

10. Norman, G. F., and Mittler, A. Interrelationship of vitamin D and sex hormones in calcium and phosphorus metabolism of rats. Proc. Soc. Exper. Biol. & Med. 67:104 Jan. 1948.

11. Mulinos, M. G., and Pomerantz, L. Pseudo-hypophysectomy: a condition resembling hypophysectomy produced by malnutrition. J. Nutrit. 19:493 May 1940.

12. Harris, E. S. The sites of alkaline phosphatase in dentinogenesis. Anat. Rec. 107, No. 2, 105 June 1950.

inhibitory to growth of mineral crystals. It should be noted that the micronutrients are associated with the enzymes in certain metabolic pathways, and it is reasonable to assume that the bone resorption and perhaps the splitting of bone by these depolymerizing enzymes are closely related and may explain in part some of the mechanism involved in bone resorption.

Fosdick[13] postulates that part of the inflammatory response may be caused by the liberation of acetyl choline. The acetylating effect on blood from individuals with periodontal disease can be determined, and one can correlate the role of coenzyme A and penothenic acid in this synthesis of acetyl choline and thus translate these results in terms of incidence of periodontal disease. Fruder[14] states that histamine and acetyl choline injected in borderline toxicity doses produces no change in inflammation.

The glycogen content of gingival tissue and the possible alteration of glycogen levels in the tissue of diabetics has been cited as a predisposing factor in periodontal disorders.[15] In other words, the role of diabetes in the etiology of periodontal disease may be considered as not that of a direct agent, but as a catalyst to the exciting factor. Animals with alloxan diabetes show lowered glycogen content of gingival tissue, and diabetes therefore may predispose to periodontal degeneration. On this basis Ziskin, Siegel and Loughlin[16] have proposed the prophylactic use of insulin by topical application.

Fosdick and Piez[17] have shown that saliva from patients with periodontitis has larger amounts of certain unidentified volatile amines (delta-amino valeric acid) than are present in saliva from normal mouths.

It is recognized that mucoproteins may increase and appear as metabolic end products in the urine or plasma of patients suffering from certain pathologic conditions, or to those exposed to stressful situations. Engel[18] reports an increase of mucopolysaccharides, or breakdown products of these large molecules, in the connective tissue of the gingiva from individuals with desquamative gingivitis. Obviously the change is produced by enzymatic depolymerization of the ground substance of connective tissue, and as such reveals additional information concerning the morphological and biochemical changes and mechanisms operating in oral pathological conditions. Extending these studies further to determine the effect of stress on periodontal tissues of the rat, using 4 per cent formaldehyde as the stressor mechanism, Shklar and Glickman[19] found degenerative changes in the salivary glands but no gross or microscopic changes in the periodontal tissue.

Occlusal trauma has been cited as one cause of periodontal disease. This questionable statement has caused Ostrom, Skillen and Fosdick[20] to suggest that if this is true, the gingival glycogen concentration has been altered. Some investigators feel that dietary deficiencies, especially vitamins C and D, may manifest themselves in poor calcification of the maxillary and the mandibular structures, producing dentofacial irregularities and malocclusion.

One of the better controlled and most significant investigations was carried out

13. Fosdick, L. S. Privileged communication to Public Health Service, National Institutes of Health, June 13, 1955.

14. Jasmin, G., and Robert, A., editors. The mechanism of inflammation; an international symposium. Acta, Inc., Montreal, Canada, Medical Publishers, p. 175 (Der Stoffwechsel des entzündeten und geschädigten Gewebes. Horst Frunder), 1953.

15. Cohen, B., and Fosdick, L. S. Chemical studies in periodontal disease. IV. The glycogen content of gingival tissue in alloxan diabetes. J.D.Res. 29:48 Feb. 1950.

16. Ziskin, D. E.; Siegel, E. H., and Loughlin, W. C. Diabetes in relation to certain oral and systemic problems. Am. J. Orthodont. & Oral Surg. (Oral Surg. Sect.) 30:758 Dec. 1944.

17. Fosdick, L. S., and Piez, K. A. Chemical studies in periodontal disease. X. Paper chromatographic investigation of the putrefaction associated with periodontitis. J.D.Res. 32:87 Feb. 1953.

18. Engel, M. B. Water-soluble mucoproteins of the gingiva. J.D. Res. 32:779 Dec. 1953.

19. Shklar, Gerald, and Glickman, Irving. Periodontium and salivary glands in the alarm reaction. J.D.Res. 32:773 Dec. 1953.

20. Ostrom, C. A.; Skillen, W. G., and Fosdick, L. S. Chemical studies in periodontal disease. VIII. Gingival glycogen concentration in experimental occlusal trauma. J.D.Res. 29:55 Feb. 1950.

by the Royal Canadian Air Force in 1944 on normal subjects. Linghorne and others[21] found gingival inflammation in healthy test subjects. Administration of massive doses of multiple vitamins for five months did not result in appreciable recession in gingival inflammation. With local treatment plus 75 mg. of ascorbic acid daily, however, there was a delaying effect on recurrence of inflammation, whereas 10 mg. or 25 mg. of vitamin C was not enough to retard the reappearance of gingival lesions. Recurrence of gingivitis in individuals on a low vitamin C intake is commonly seen by dental clinicians.

The dentist who recognizes minor clinical symptoms of nutritional deficiencies in the periodontium early can forestall the development of more serious periodontal lesions. The effect produced by ingestion of excessive amounts of refined carbohydrates, lowered intake of high vitamin C foods, reduced intake of high quality protein and predominance of soft, nondetergent foods demonstrates the need for more research into the problem of patient susceptibility to dental diseases.

Although much attention is focused on the inadequate diet, there is no assurance that an adequate diet will provide proper nutrient levels to tissues in all instances. For example, some of the factors that detract from the benefits of an adequate dietary are those that: (1) interfere with ingestion; (2) cause destruction of nutrients; (3) increase excretion of specific nutrients; (4) interfere with absorption and utilization of nutrients, and (5) increase nutrient requirements. A few examples of such factors are: allergy, ulcer, colitis, hyperthyroidism, high temperature, achlorhydria, diarrhea, diabetes, and drug poisoning.

NUTRITIONAL FACTORS RELATED TO DENTAL CARIES

There is a plethora of information and objective evidence in the literature relating to the effect of nutritional factors on dental caries. Detailed discussion of all such factors is impossible. Consequently, only some of the current concepts regarding dental caries will be mentioned, and only the more common preventive and corrective measures used today will be discussed. An excellent short review on this subject is provided in a report prepared by the Committee on Dental Health of the Food and Nutrition Board of the National Research Council.[22]

One of the dominant theories concerning the development of dental caries is that certain chemical-bacterial action takes place in the oral cavity which causes a breakdown of tooth enamel. This is rather a restricted viewpoint. Many researchers stress the broader view—that there are certain factors present which permit the exciting causes to operate, such as, for instance, bacteria within the plaque on the tooth and organic material on the tooth surface which is capable of being converted into harmful substances.

The organisms most commonly believed to be responsible for dental caries have been acid-producing lactobacilli, streptococci, staphylococci and yeasts. Most recently investigators at the University of Chicago,[23] in studies with rats, have narrowed the field to a specific microorganism, enterococcus, a member of the streptococcus group. Associated with this same study is the work conducted at the Lobund Laboratories[23] at the University of Notre Dame where rats of a caries-susceptible strain in a germ-free environment, eating a sterilized caries-producing diet, did not show evidence of carious lesions. Control animals eating a sterilized

21. Linghorne, W. J., and others. Relation of ascorbic acid intake to gingivitis. Canad. M.A.J. 54:106 Feb. 1946.

22. Committee on Dental Health, Food and Nutrition Board. Control of tooth decay. Washington, D. C., National Academy of Sciences, National Research Council, 1953.

23. Orland, F. J., and others. Use of germfree animal technic in the study of experimental caries. Basic observations on rats reared free of all microorganisms. J.D. Res. 33:147 April 1954.

caries-producing diet also did not show evidence of carious lesions. Control animals eating a sterilized caries-producing diet but not handled in a germ-free environment, however, showed a high incidence of dental caries. This investigation establishes the fact that carious lesions are bacterial in origin. Furthermore, carious lesions do not develop in desalivated rats,[24] nor do they develop when the carbohydrate portion of the cariogenic diet is introduced by tube into the stomach of the test animal.[25]

Plaque containing well-dispersed carbohydrate, fat and protein food particles and chemical deposits from saliva and bacteria may have a protective action on tooth enamel because of its buffering capacity. Saliva contains some antacid and antibacterial agents. Some investigators find that the saliva of persons resistant to caries has a higher antacid capacity than the saliva of persons with extensive dental caries.

The composition and structure of the tooth have an important bearing on tooth decay. Dependent largely on the metabolic processes of the body, the composition and structure of the teeth may be controlled largely by heredity; in animal experiments, at least, susceptibility to caries is related to genetic background.[26]

The effect of dietary components on the development of carious lesions has been covered extensively in the dental literature. McCay[27] presents an interesting discussion of the detrimental effects on teeth produced by imbibing soft drinks and cola beverages and by the excessive ingestion of sugar. McCay classifies beer, root beer and cultured milk as common beverages that produce no erosion. Other substances which he mentions as offering possibilities of preventing acid erosion are fatty acids (stearic), phytic acid (in bran), oxalic acid and fluorides.

There is a preponderance of documentary evidence regarding the effect of refined carbohydrates on dental health and also on the advantages of reducing the intake of refined carbohydrates and replacing them with natural or protective foods. The most intensive study in this field was undertaken at a mental institution at Vipeholm, Sweden from 1946 to 1952,[28] where it was found that the physical form in which sugars were ingested was more important than the total amount consumed.

From a preventive standpoint, the role of proteins in the formation and general metabolism of odontogenic tissues appears to have considerable importance. Dental tissues have a priority demand for amino acids. There are indications that incisors rate very high in this respect.[29] In order that optimal growth and replacement of tissues may take place, adequate amounts of amino acids must be present in the diet to serve as raw materials for synthesis of new tissues. The organic matrix of teeth and bone is composed of protein. Improper formation of the matrix will occur if hypoproteinemia occurs. Such a situation is commonly referred to as osteoporosis.

Animal experimentation and clinical investigation have demonstrated that the feeding of desiccated thyroid to animals produces an anticariogenic effect; this is also true for hyperthyroidism.[30] Feeding thiouracil to rats increases the incidence of dental caries. It is believed that the feeding of desiccated thyroid increases salivary flow and hence raises the level of salivary iodide. The same condition is

24. Prevention of tooth decay by tube feeding. Nutrit. Reviews 9:101 April 1951.

25. Haldi, J., and others. Relative cariogenicity of sucrose when ingested in solid form and in solution by albino rat. J. Nutrition 49:295 Feb. 1953.

26. Strain variation and caries susceptibility. Nutrit. Reviews 10:276 Sept. 1952.

27. McCay, C. M. Nutritional factors in the maintenance of bones and teeth. New York D.J. 17:429 Nov. 1951.

28. Gustafsson, B. E., and others. Summary of findings in Vipeholm studies. Svensk Tandläkare-Tidskrift 45 suppl., 1952.

29. Hunter, H. A. Hypoproteinemia in relation to dental tissues. J.D.Res. 29:73 Feb. 1950.

30. Muhler, J. C., and Shafer, W. G. Experimental dental caries. IV. The effect of feeding desiccated thyroid and thiouracil on dental caries in rats. Science 119:687 May 14, 1954.

produced by hyperactivity of the thyroid gland. The presence of the iodide in saliva is as anticariogenic as fluoride.

It has been indicated previously that microbial enzymatic degradation of fermentable carbohydrates accelerates decalcification of the enamel or inorganic portion of the matrix. Dental caries should be prevented by the use of enzyme inhibitors. Fosdick and co-workers[31] report that certain compounds will attach themselves to the dental plaque for a long time and serve as enzyme inhibitors. The most successful of these compounds are sodium N-lauroyl sarcosinate and sodium dehydroacetate which, when applied in dentifrices or in mouthwashes, have some inhibiting effect on the production of dental caries.

Although there is some opposition to fluoridation of water, the public health advantages of fluoride as a protection against tooth decay are well recognized. The correct level of fluoride in drinking water (1 ppm) is important since higher levels may produce mottled enamel. Children up to 14 years of age appear to benefit most from fluoridation. Muhler and his group[32] at Indiana University have reported promising results from the use of a dentifrice containing stannous fluoride. Stannous fluoride is believed to be superior to sodium fluoride in reducing dental caries.

Equally as important as fluoride in the treatment of dental caries is a newer discovery in the form of a trace mineral, vanadium, which has been found to inhibit caries development in the dentin and enamel.[33] A theory has been advanced that vanadium, like lead, deposits itself in the interglobular dentin and the dentinal tubuli, and hence imparts resistance to external agents in the decalcification process.

Dunning[34] recognizes a relationship between latitude and the distance from the seacoast to the incidence of dental disease. Previous studies by other investigators have shown correlations in geographical variations to nutritional status. It is interesting to speculate how much the ingestion of locally grown foods and the drinking of local water might affect Dunning's hypothesis.

As newer knowledge of nutrition becomes available, it will help to remove some of the existing misconceptions regarding the importance of nutritional therapy and dietary management in the alleviation of chronic diseases such as dental caries and periodontal disturbances. Furthermore, the compilation of information from current nutritional research should help to explain certain biochemical mechanisms in the body processes, specifically those related to the repair and synthesis of dental tissues, and thereby provide better measures for the prevention, correction and cure of dental disorders.

31. Fosdick, L. S., and others. New approach to the problem of dental caries control. J.D.Res. 32:486 Aug. 1953.

32. Muhler, J. C.; Nebergall, W. H., and Day, H. G. Fluoride toothpaste. Science News Letter, Feb. 12, 1955, p. 100.

33. Geyer, C. F., Vanadium, a caries-inhibiting trace element in the Syrian hamster. J.D.Res. 32:590 Oct. 1953.

34. Dunning, J. M. Influence of latitude and distance from seacoast on dental disease. J.D.Res. 32:811 Dec. 1953.

Maturity • Though it is the young scientists whose brilliant researches have revealed so much about the physical world (even to the fission of the atom), it is only mature adults who can reveal all the immense and significant potentialities of mankind. At last we are approaching an era in which man lives long enough to think. In thinking he grows, and in growing, lives. ***Anton J. Carlson, Physiological Changes in Aging, 1952.***

Dental health officers for local health units

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The field of dental public health is concerned with "those organized community health services which cannot be rendered by the private practitioner alone."[1] From this definition, adopted by the American Dental Association, the great importance placed on the development of local or community dental health programs is apparent. The establishment of such programs as a means of improving the dental health of the nation has been urged by the American Dental Association for years.

Today there are numerous methods and technics for combating dental disease on a mass scale, thus improving the dental health of the population. Promotion of dental health can only be accomplished, however, by the successful application of the available methods. Hence, the main efforts in the field of dental public health are, or should be, directed toward persuading the community to accept and utilize the newer knowledge of dental health. This means changing long-established habits and modes of living, which is not too easy to accomplish, (particularly in undramatic diseases such as dental caries and periodontal disease), without a thorough understanding and appreciation of the different factors and conditions (cultural, economic, and social) peculiar to each community.

As a dental health aid, a study was made among the health officers of Oregon to ascertain their attitudes, reactions and comments regarding the employment of dental health officers (public health dentists) on the regular staff of community health units. This information was desired because the local health department is responsible for the preservation of health, including dental health, of the people of its area.

METHOD AND RESULTS

The state of Oregon is composed of 36 counties. Of these, 19 are served by full-time health departments (14 single county units and 2 district units). The remaining 17 counties are classified as unorganized, without full-time health services.

For the purpose of the study, a questionnaire and an explanatory letter were sent to every full-time and part-time health officer of the state, 33 in all. Replies were received from 31.

None of the community health departments of Oregon employs a dental health officer (public health dentist) on a regular staff on a full-time basis. Only Multnomah county, which is one of the state's most populous counties, reported that a public health dentist is on the staff on a half-time basis, together with a full-time dental hygienist.

From the returned questionnaires it was noted that some of the health officers were aware of the magnitude of the dental health problem in their counties, and also indicated that it would be desirable to have a dental health officer on the

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1. American Dental Association. Transactions 1952.

staff of the local health unit. Some explanations were given as to why the creation of such a position on the local health unit has not materialized or is not considered essential. The two most frequently cited reasons were budgetary limitations, and sparsity of population.

Other comments offered by the officers included: "Do not think an effort has been made to acquire a dental health officer." "The general public would have to be sold on this program." "We have needs with greater priority." "At present time not practical because too many programs—fluoridation on agenda." "Number of dentists available for population of the county seems sufficient." "We have only two dentists in the county and they are so overworked I feel that neither of them would be willing to undertake any additional duties. They have been examining the school children under a minimal fee basis and everyone seems satisfied with the arrangement." "A program of dental examinations would only make people more unhappy than they are because they cannot get the treatment needed. If such a person did treatment, the cry of 'socialized dentistry' would be raised and he could only do a very small part of the treatment needed anyway."

The suggestion was made by some officers that in view of budgetary limitations and sparsity of population it might be possible to make arrangements between neighboring counties for the employment of dental health officers on a district level. The possibility of employing dental hygienists and the need for more dental health education were also proposed for consideration.

DISCUSSION

The results of the study not only indicate the existing situation in one state regarding the employment of dental health officers on the local health unit, but also parallel similar conditions prevailing in the rest of the country. From a recent report on the number of personnel employed by the nation's 1,389 full-time health departments which serve 2,229 counties and include 89 per cent of the population, it was shown that only 236 dental health officers are employed on a full-time basis at the local level.[2] The remaining 11 per cent of the population is not covered by full-time local health services. Of these 236 dental health officers, 145 are on the staff of city health departments and the remaining 91 are employed by single county health units and local and state health districts. According to the same report, only 367 dental hygienists are on the staff of local health units.

Commenting on the importance of developing local or community dental health programs, Phair[3] stated:

> It has been recognized, through both tradition and experience, that it is in the community where health needs can best be determined, where resources can be utilized to the fullest extent, where the desires and interests of the people can be made known and, in the final analysis, where the actual health services are performed.

In general, the impetus or initiative for developing community dental health programs comes from two main sources: (1) the dental health division of the state department of health and (2) the local dental practitioners. The participation and cooperation of the local dentists is an absolute essential for the successful establishment of such a program.

Today, however, the number of organized community dental health programs is extremely small. From a survey conducted a few years ago by the Council on Dental Health of the American Dental Association it was revealed that out of 40,000 communities in the country

2. Greve, C. H., and Campbell, J. R. Organization and staffing for full-time local health services. Pub. 441. Washington, D.C., U.S. Department of Health, Education, and Welfare, Public Health Service, 1953.

3. Phair, W. P. American Dental Association program for community dental health. J.A.D.A. 46:438 April 1953.

only 5,000 had some type of community dental health program.[4]

Although there are reasons for the scarcity of community dental health programs in the country, undoubtedly some important ones stem directly from the dental practitioners. In a recent study it was indicated that some of the difficulties arise from lack of knowledge and understanding on the part of dentists regarding the scope and nature of community dental health programs.[3, 5] Another contributory factor is that dentists in the past have not received adequate instruction in public health during their undergraduate dental education and, as a result, they are not well prepared to exercise leadership in the development of dental health programs.[6]

The dental health divisions of state departments of health are contributing a great deal of time and effort to promote and motivate the development of community dental health programs. A number of state dental health divisions are handicapped in their efforts, however, by inadequate personnel and also by the great size of the state. In the case of Oregon, for example, the dental health division of the state board of health is composed of only the director and one dental hygienist, yet the state of Oregon occupies an area of 96,981 square miles.

In view of these facts, it is necessary to consider and explore new approaches for the fulfillment of dentistry's objective; that is, the establishment of successful dental health programs in every community of the United States. In line with this, the employment of dental health officers by the local health department or unit is certainly a step in the right direction. Although some progress has been made in the number of dental health officers employed on the staff of local health departments, much remains to be done.[7]

The advantages of such a system or approach are obvious. At the present time, the successful operation of community dental health programs depends to a great extent on the continuous and enthusiastic participation and interest of local dental practitioners. In view of the complexities, multiplicity of activities, and time involved in conducting such programs, however, this is not always easy to accomplish and many promising beginnings fail to reach full fruition. On the other hand, a dental health officer on the staff of the community health unit will have the opportunity to acquire a thorough knowledge and understanding of the problems, resources, and potentialities of his area. As a result of this, he will be in a better position to exercise effective leadership not only for initiating appropriate dental health programs but also for sustaining and expanding their operation. He will be able to coordinate the activities and give expert guidance to the different lay and professional groups interested in dental health improvement.

The main difficulties encountered in Oregon regarding the employment of dental health officers by the local health unit or department may reasonably be assumed to be also applicable to the rest of the country. One of the obstacles most frequently cited in the study seems to be lack of sufficient funds. The suggestion that neighboring counties combine forces for employing a dental health officer on a district level should be explored vigorously. Such an approach is promising and seems particularly advantageous for counties with small population and limited resources.

On the basis of comments contained in the questionnaires returned, however, it would seem that other important factors are also responsible for this situation. It

4. Phair, W. P. Community dental health programs in the United States: results of a survey. J.A.D.A. 43:722 Dec. 1951.

5. Skinner, M. L. Report of the pilot study on health education for dental health. Albany, N.Y., Bureau of Dental Health, N.Y. State Health Dept., 1952 (Mimeo.).

6. Hadjimarkos, D. M. Teaching public health to dental students. Am. J. Pub. Health 44:1352 Oct. 1954.

7. Trends in public health dentistry. A Committee Report. Am. J. Public Health, 46:353 March 1956.

appears that no concerted effort has been made to create a position for a dental health officer on the staff of the local health unit. This in turn may stem, in part, from lack of understanding of the magnitude of the dental health problem by those responsible for the appropriation of funds for the operation of the health unit. It may be that the local dental practitioners have not exercised the leadership expected of them in promoting the creation of such a position. As one health officer stated, in discussing the steps to be taken for creating such a post, "we would need the consent and cooperation of the local dental society."

Furthermore, from the remarks made by the health officers participating in the study, the impression has been gained that some of them might not have a clear picture of the objectives of dental public health and of the role, responsibilities, and duties of a dental health officer.

It is apparent that there are major obstacles to be overcome before positions for dental health officers at the local health unit are created. The responsibility for this rests to a great extent on the dental profession, and in the final analysis it is one of education. The dental practitioner, by virtue of his professional standing, is a highly influential member of his community and often occupies a position of public and civic importance which enables him to exercise effective leadership. Thus, the state and local dental societies should exert every effort among lay and professional people to: (1) convey to them an understanding of the basic objectives and philosophy of dental public health, (2) present information regarding the seriousness of the dental health problem and (3) explain the value and the necessity of having a dental health officer, either full or part-time, on the local health team.

When all the facts are presented and explained, there is every reason to believe that satisfactory arrangements, budgetary and other, can be made in the majority of instances. Clearly, the expenditure of over 1.5 billion dollars by the American public in the course of one year for dental care, and also the magnitude of the nation's unmet dental needs indicate that dental health constitutes a major health problem that merits serious consideration, both by the health professions and lay groups of every community.

It is gratifying to note in this connection that recent trends in dental education indicate that the dentist of the future will have a more adequate background of dental public health objectives and practices, thus increasing his potential contribution to the community in the improvement of dental health.[8-12]

SUMMARY

A study was conducted among the health officers of Oregon to ascertain their attitudes, reactions, and comments regarding the employment of dental health officers on the regular staff of the local health departments of the state.

The results showed that none of the local health units of the state employs a dental health officer on a full-time basis, and also revealed important reasons responsible for this situation. The findings in Oregon parallel similar conditions prevailing in the rest of the country.

The value of employing dental health officers on the regular staff of local health departments as a means of improving the dental health of the people is discussed and a plan toward realization of this end is suggested.

8. Hadjimarkos, D. M. Field training in public health for undergraduate dental students. J. D. Educ. 19:223 Nov. 1955.

9. Peterson, Shailer. Current status of public health dentistry courses for undergraduate dental students. J. D. Educ. 20:95 March 1956.

10. Gruebbel, A. O. Objectives of a course in public health dentistry. J. D. Educ. 20:114 March 1956.

11. Easlick, K. A. Qualifications and training of the teacher of dental public health. J. D. Educ. 20:119 March 1956.

12. Gelagan, D. J. Proposed ideal curriculum for a productive course in public health dentistry. J. D. Educ. 20:127 March 1956.

Florida's scholarship program for the study of dentistry

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The 1955 Florida legislature established ten scholarships to be awarded annually to Florida students who wish to become dentists. Each scholarship may be for as much as $1,000 per year and for as many as four years, or a total of $4,000. This scholarship program has two primary objectives.

First, the awarding of ten dental scholarships each year will encourage a limited number of capable students to plan for dental college even though their financial resources may appear inadequate for the pursuit of a professional career.

The second objective is to encourage competent, well-trained young dentists to establish their practices in those areas of the state which are in greatest need of dental service. This is important in Florida because, in terms of income, it is a heterogeneous state. In its resort areas there is considerable wealth. In some rural counties the per capita wealth is low. It is not surprising that dentists have concentrated in the communities of greater financial resources.

To alleviate this situation the law provides that, on being awarded a scholarship, the student must sign an agreement stating that, after he has graduated from dental college and been duly licensed to practice in Florida, he will practice for five years in one of Florida's smaller communities or rural areas where there is need for his services. These areas are designated by the State Board of Health. For each year that the student practices in the community to which he has been assigned, one fifth of his scholarship obligation will be cancelled, and after five years of practice, the entire scholarship will have been repaid.

To be eligible for a state dental scholarship, a student must (1) have been a citizen and resident of the State of Florida for not less than five years prior to the date of his application, (2) have successfully completed his predental training at an accredited college or university and have been accepted for admission to a fully accredited dental college and (3) be in genuine need of financial assistance to meet the cost of studying dentistry.

All applications are first processed by the State Board of Health. The awards are made by this agency on recommendation of the scholarship committee of the Florida State Board of Dental Examiners which evaluates each application.

Since the inception of the program in June 1955, 20 scholarships have been

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awarded to students who are now attending ten different dental schools located throughout the nation.

In 1958 the first two scholarship recipients will have completed their professional training and will be assigned to areas which have been determined to be in need of a dentist, and, as far as possible, to the community of their preference. Every effort will be made to work with the civic leaders and public officials of those communities for the purpose of making the young dentists' practice so attractive and profitable that they will want to remain in the community and build a permanent practice there rather than leave after the five year assignment has been completed.

Problems faced by prepaid dental plans

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The growth of prepayment plans for hospital and physicians' services is one of the striking health developments of the past 20 years. Despite the climate of controversy in which this development took place, two impressive facts can be noted:

1. The principle of prepayment for hospital and physicians' services has captured the interest and attracted the support of approximately 100 million people in the United States.

2. There is general agreement that the prepayment principle should be applied to cover more of the health needs of more people. The pressures for expansion of coverage in breadth—more people—as well as depth—more services—are becoming increasingly greater.

RATIONALE FOR DEVELOPMENT OF PREPAYMENT PLANS

The rationale for the development of organized financing of health services, that is, prepayment, must be viewed against the backdrop of a highly urbanized and increasingly more industrialized society. It may be summarized as follows:

High Cost of Modern Health Services • A statement that the high cost of modern health service is partly responsible for the development of prepayment plans is in no sense accusatory against any group of providers of health services or any set of institutions. High costs are simply an expression of the application of increased scientific technology in the health services. The author believes that the increased benefits in terms of prevention and reduction of disability are well worth the increased costs.

Uneven Burden of Costs of Health Services • Dental costs, as well as costs for physicians' care and for hospitalization, are distributed unevenly among families. There is this unevenness within as well as between income groups. In a recent nation-wide survey sponsored by the Health Information Foundation it was found that 44 per cent of all families incurred no dental bills in a 12 month period, whereas 4 per cent incurred charges of over $195.

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Relationship Between Ability to Pay for, and Receipt of, Health Services • The hard fact is that, on a pay-as-you-go basis in contrast to a system of organized prepayment financing, health services are received in accordance with ability to pay rather than in accordance with need. This fact is clear in regard to dental care. No expenditures for personal health service appear to be so closely correlated with income as dental service. Stated another way, there is a great difference in the amount of dental service received by different income groups as measured by visits to dentists.

The Health Information Foundation survey disclosed that among all families, 34 per cent of the members sought the services of a dentist during a 12 month period. In the lowest income group—those having less than $2,000 annual income—17 per cent sought service; and in the group with annual incomes of $7,500 and over, 56 per cent sought service. There is every reason to believe that the lower the income group, the higher the proportion of emergency dental service—extractions and procedures for the relief of pain—and the lower is the proportion of preventive care and restorative work.

PREPAYMENT PLANS

The tremendous growth of prepayment plans for hospital care and physicians' services in the United States makes all the more remarkable the lag in the extension of this financing mechanism to dental care. True, after years of discussion devoted principally to the obstacles that prevent dental care from being offered as a prepaid service, dental prepayment plans are beginning to emerge. Much of the discussion has centered around the insurability of dental care, and the frame of reference has been the rigid and classical criteria laid down for insuring against economic losses. Thus dental care and, in some quarters, physicians' care, is equated with property loss, and the $50 deductible automobile insurance policy is proposed as a model for a prepaid health service plan.

The actuarial soundness of any prepaid scheme, dental or other, should be insisted on. There is, however, also a requirement for social soundness, that is, a goal of health services rather than mere protection against economic or property losses. If funds are available and the goal is health service, prepayment can cover any desired service.

Another set of arguments against the feasibility of extending the prepayment principle to dental care concerns the striking disparity between the need for dental care and dentistry's manpower resources to meet the need. This can be stated in these terms: Over four and a half billion American teeth have decayed and are decaying at a rate which—estimated from studies of time requirements for examinations, fillings, replacements and other treatments—is about three times the rate with which present dental personnel can cope. This impressive deterrent relates more particularly to the introduction of a plan for comprehensive dental care for the whole population of the United States than it does for the development of local plans.

A few words about existing dental prepayment plans. Distributed geographically from the East Coast to the West, they exhibit differing characteristics with respect to sponsorship, population coverage, scope of benefits and methods of providing services and financing. For example, sponsorship varies from that of a trade union, as in the case of the Labor Health Institute of St. Louis and the International Longshoremen's and Warehousemen's Union and Pacific Maritime Association's Welfare Fund Dental Care Program on the West Coast, to that of an insurance company with active dental society support, as in the case of Group Health Dental Insurance, Inc., of New York. Population coverage may be community-wide, or limited to membership

in an already established medical care plan as in the case of Group Health Association of Washington, D. C., or even restricted to a specific age group, as with the West Coast plan in which only children up to age 15 are included. Benefit provisions likewise range in scope from virtually unlimited care (except for orthodontics) to care only on a maintenance basis after the subscriber pays for the correction of all defects existing at the time of enrollment.

Dental services may be provided by dentists in private practice in their own offices, or by full-time salaried dentists using the clinical facilities of the plan. Participating dentists may be paid on a fee-for-service basis, with the right to charge their usual fees to upper-income subscribers, or on a negotiable capitation basis. The benefits to be provided may be paid for entirely by the subscriber on a cost basis or as monthly premiums, or they may be financed entirely from union welfare funds resulting from collective bargaining agreements.

Although the dental prepayment movement is still in its early developmental stages, it is not too soon to give serious consideration to the lessons that are being learned from prepayment for hospital and physicians' care. This exposition will deal particularly with benefit provisions, financing and administration.

BENEFIT PROVISIONS

The funds which are collected through prepayment may be used to provide dental services or cash payments. The former is known as a service benefit and the latter, an indemnity benefit. The difference is crucial both for patient and dentist. Under the service type of plan, the patient is afforded full protection at a definite precalculated cost. Under the cash indemnity benefit the patient (or his dentist) receives a cash payment which may or may not meet the professional charges. From the patient's standpoint, such cash payments appear to establish a floor under the dentist's charges without imposing a ceiling.

It must be admitted that the cash indemnity approach has considerable support since it represents the least degree of interference with the status quo of private practice dental economics. Nonetheless, it is fundamentally a mere fiscal arrangement between the insuring agency and the insured. As such, the profession cannot justify a real claim to professional control or sponsorship of such a plan even though it may have an important stake in its actuarial soundness.

The service plan requires a two-way contractual relationship, between the insuring agency and the insured and between the insuring agency and the provider of service. The dentists who participate in such a scheme agree to provide specified services to subscribers, accepting as payment in full the fees negotiated between them and the plan. Here professional control and sponsorship have a valid claim, and health service, rather than protection against economic loss, can be the goal. The contractual relation between the plan and the participating dentists, and the professional sponsorship, both imply responsibility for attention to the quality of the services provided. This is an element characteristically absent in the cash indemnity plans.

Observers of the current prepayment scene point to the intensity of the competitive struggle between the professionally-sponsored hospital and physicians' service plans, Blue Cross and Blue Shield, and the commercial insurance plans of the cash indemnity type. The outcome of this struggle, many are convinced, will be determined by the degree to which the professionally-sponsored plans exploit the opportunity to make health service a goal.

Any discussion of the benefit provisions under prepayment must concern itself with a persistent myth, abuse of service. There has been a noticeable increase in

the utilization of all personal health services in this country since 1940. In part this increase can be attributed to the improved economic conditions which have increased purchasing power for health services; in part, to greater availability of services and in part, to the development of prepayment plans. Prepayment *per se* is followed by an increase in the utilization of health services. Whether this increase represents abuse of service, that is, the demand for unnecessary health services due to removal of the economic barrier by prepayment, is subject to debate. The difficulty lies in the lack of acceptable standards for determining necessary care.

Utilization rates, that is, the experience of plans in providing benefits to their subscribers, reflect the changing patterns of practice of thousands of practitioners and their patients. They also are an expression of the increased body of scientific technology which a more enlightened public demands. What was a normal utilization rate 25 years ago is no longer a normal utilization rate today. Thus a hospital admission rate of 130 per thousand population today may be just as normal as a rate of 50 not so many years ago.

The generally held interpretation of increased utilization, however, is that it is principally due to the excessive demand by subscribers for services. As a matter of fact, the unfavorable experience of several early plans offering physicians' care in the office and home was uncritically attributed to abuse of service by subscribers. This interpretation has been an important factor in restricting the benefits of Blue Shield plans to hospitalized patients.

Analysis of data from current plans offering physicians' care in the office and home indicates that abuse of service is a minor problem. This holds whether abuse is measured by overutilization of service, "shopping around" for physicians, or excessive demand by newly enrolled subscribers. Actually, there are data which indicate that in groups with 100 per cent enrollment there is a significant lag in the utilization of benefits. It is only after the subscriber becomes educated to the benefits to which he is entitled that utilization rates approach expected values.

Analysis of utilization of benefits by subscribers in a plan which provides virtually unlimited physicians' care, Windsor Medical Services of Ontario, indicates that year after year, over a third of all subscribers receive no physicians' services at all in a 12 month period. In the Windsor plan all economic barriers have been removed, there is complete free choice of physician, and there are no restrictions on the subscriber in making demands for physicians' service.

Even under these circumstances, physicians' care is not assigned as high a value by as many subscribers as the profession would like to see. Too large a segment of the population does not demand dental care on a pay-as-you-go basis unless there is pain or discomfort. Most dental care can be postponed by the individual, and most dental services are more or less elective in nature. Even under prepayment, it appears that subscribers may not avail themselves of benefits to which they are entitled under their particular plan.

The experience of the Labor Health Institute of St. Louis dental plan, a prepayment plan in operation since 1946 providing all types of dental care except orthodontics, is illuminating. Of the approximately 15,000 persons eligible for dental service, slightly more than 9,000 availed themselves of this service during the 12 months of 1952. That is, about a third of the participants in the plan are nonusers of service. Here again evidence of abuse is lacking, and observers are forced to question the view that some people place a high recreational value on a visit to a dentist's office.

FINANCING

Several observations can be made based on the experience of prepayment plans which furnish hospital and physicians' care. The first relates to the adequacy of payment to providers of service. Adequacy of payment to those who provide the service does not of itself guarantee high quality of care, but inadequacy of payment brings deterioration since it does nothing to encourage good care.

There is the general belief that people are unwilling to pay additional premiums for more comprehensive benefits. Yet it has been found that those Blue Cross plans, for example, which have enrolled the greatest proportion of the population in the areas they serve, are precisely those plans which have the highest premium rates. The public appears willing to pay the increased costs for more adequate protection on a prepaid basis.

It is suggested that wide segments of the public have been educated to the benefits of prepayment in meeting the costs of personal health services, and that as plans providing dental care are made more widely available, the public will avail themselves of this kind of protection. That is not to deny that there will be consumer resistance to dental plans which entail burdensome costs before the subscriber is entitled to dental service on a prepayment basis; or that there will always be sympathetic understanding and widespread acceptance of prepayment plans restricted to children. Although the latter type of plan is logically designed to handle the problems posed by the backlog of unmet need, the demands for treatment for acute conditions in adults cannot be brushed aside.

The increasingly important part played by "third party payers" needs to be recognized. There are now over 75 million individuals entitled to some type of personal health service by virtue of being covered by employee welfare and pension programs. Employers, the third party, are paying for part or all the premiums in prepayment plans and are supporting entirely or in part the health and welfare funds set up under collective bargaining. The inclusion of dental benefits in health and welfare plans is an important development, as those who live on the West Coast and the Atlantic seaboard know. In these plans the ability to prepay for dental care depends more on the outcome of the bargaining session than on the individual employee's income.

ADMINISTRATION

At this stage of development it is fortunate that there are a variety of dental prepayment plans differing in their administrative technics. Among the important differences is the manner in which the services are organized and the dentists paid. The proponents of group dental practice, with dentists on a full or part-time salary practicing in a well-equipped clinic, point to the efficiencies of this type of practice; the ease of referral of patients; the full use of auxiliary personnel. Nevertheless, as is true with medical practitioners, only a small percentage of dental practitioners are engaged in this form of practice. Traditions of practice and the attitude of the organized profession indicate that, to a great extent, prepayment plans will be based on the individual method of practice in which the dentist and the physician receive payment from the plan on a fee-for-service basis.

From the standpoint of the plan, however, other methods of payment are preferable. In the fee-for-service method of payment plan there is no limit set on the income from the plan for any individual participating dentist. Payments made by the plan to any individual dentist depend only on the volume and kind of service he performs, even though the payments are based on a predetermined schedule of fees.

Since the financial stability of any plan, regardless of the method of payment of dentists, demands that payments into the insurance fund equal or exceed payments out of the fund, there is obviously a limit to the total payments that can be made to all the participating dentists. The capitation method of payment automatically balances plan income and outgo by predetermining the sum to be paid to the dentist on behalf of each subscriber. Under a salaried system of payment, the predetermined amount of money paid by the plan to each participating dentist likewise sets the limit on the fiscal liability of the plan. Staying within a fiscal limit is achieved automatically, therefore, in capitation and salaried plans, although other difficulties may arise. In fee-for-service plans, however, control procedures must be applied to achieve this end.

Since the success of these plans depends to a large extent on the efficacy of the control procedure, increasing attention is being paid to this problem. The methods of control in fee-for-service plans now in use—administrative review of rendered bills, prior authorization for expensive services, and prorating of fees—are far from satisfactory. For this reason the Bureau of Public Health Economics, University of Michigan, is working intensively on the development of an improved administrative control procedure for fee-for-service plans.

Finally, as regards administration, it can be pointed out that where attention is focused exclusively on organization of the financing, improvement of the quality of care is left to chance. Unless administrative devices to promote the quality of dental care are built into the prepayment plan, the goal ceases to be health services.

CONCLUSION

In applying the prepayment principle to dental care society faces a new development which demands the type of critical and objective study that should have been, but was not, undertaken early in the development of Blue Cross and Blue Shield plans. Whether all, a number, or one of the current dental plans will succeed, fall short of the objectives, or collapse, cannot be predicted. Regardless of the outcome, each plan contains a body of experience, and the experience, adequately analyzed, offers a basis for the formulation of professional policy.

Continuing Education • A medical education must furnish not only the basic core of knowledge without which the title "doctor" cannot be honourably borne, but an abundant, vivid, and practical experience in the use of scientific method. Of the two, the latter has the greater value, since it is the enduring instrument whereby new knowledge can be tested. It is the means of continued healthy growth that assures that the ageing physician's practice will not remain for ever that of his first indoctrination. *Liebow.*

Cases and Comments

COMPLICATED MANDIBULAR FRACTURE

By Norbert V. Perry, D.M.D., and James Bolton, Jr., D.D.S., New Bedford, Mass.

On January 26, 1953, a girl, aged 17, was admitted to the hospital after an automobile accident.

The possibility of internal injuries and concussion permitted only a cursory examination of facial lacerations, which were deep. There was an imprint across the tongue where the mandibular teeth had bitten into the tongue. The teeth on the maxillary denture were buried in the tongue, which was held extruded from the mouth. At this time, facial lacerations were sutured and the denture removed. The tongue, which had nearly been severed, was sutured. The patient was given sedation, and daily penicillin therapy instituted.

On the next day, oral examination revealed considerable induration of the floor of the mouth. The tongue, protruding from the mouth, was badly discolored and swollen. Considerable edema was noted on the left side of the face and neck, and the patient was unable to speak coherently or to swallow without pain. Discoloration of the face and neck was widespread (Fig. 1).

The maxilla was edentulous, and there were several teeth missing from the mandible. The left side of the body of the mandible was displaced laterally and rotated. Multiple lacerations of the mucous membrane were present throughout the oral cavity.

Roentgenograms revealed no skull injuries and no skeletal fractures. The fracture of the mandible was bilateral, compound and comminuted, with considerable separation and displacement of the parts. The anterior line of the fracture appeared between the right cuspid and the right lateral incisor, starting at the alveolar ridge and then passing vertically downward through the body of the mandible to the inferior border.

The distal fracture in the left molar region began at the alveolar ridge and took a course with a distal inclination through the body of the mandible, terminating at the inferior border approximately 1.5 cm. anterior to the angle. The third molar extruded from its socket and was tissue-borne. The left ascending ramus was tipped anteriorly and slightly to the mesial side. The left side of the body of the mandible was a floating segment which tipped laterally and rotated on its long axis (Fig. 2).

All routine laboratory tests were within normal limits. On January 29, 1953, the patient was examined in consultation with a neurologist, and cranial injury was ruled out.

A liquid diet high in calories and proteins was maintained and was supplemented with vitamins. Hot moist compresses were applied to the face, and warm alkaline mouth rinses prescribed. The patient was watched for respiratory distress.

By February 1, the areas of edema were in the process of reduction.

Sedation was increased the next day, and intravenous feeding instituted in the form of 1,000 cc. of 5 per cent dextrin in water since the patient refused to accept fluids. The operation for reduction of the fracture was performed February 3 under general anesthesia. Anesthesia of choice was oxygen and ether administered endotracheally.

A split arch bar was wired firmly to the mandibular teeth. A stab incision was made in the cheek at the level of the superior border of the zygoma, one inch anterior to the tragus of the ear. A 24 gauge, four inch spinal needle with the hub removed was passed down along the medial wall of the zygomatic arch and then anteriorly to penetrate the mucous membrane of the oral cavity at the region of the posterior tuberosity.

Next, a 25 gauge stainless steel wire was passed through the needle. The needle was withdrawn leaving the wire in position in the oral cavity, half a length in the mouth and the other half emerging through the site of the puncture. Again the needle was inserted through the external opening and passed downward, this time along the lateral wall of the zygomatic arch. The wire end which protruded externally was inserted through the needle and brought down into the mouth so as to loop the zygomatic arch. Then the needle was withdrawn through the mouth. This procedure was repeated on the opposite side, leaving two wire ends at the mucobuccal fold of each tuberosity.

The maxillary denture with the arch bar attached was then inserted. The wires entering the region of the posterior tuberosity were fixed to the bar on the denture, which was seated in place and stabilized firmly. The mandibular left third molar, held by tissue, was removed.

At this time, the left angle of the mandible was exposed by an incision along the inferior border, and the fractured ends were exposed. Holes were drilled on either side of the frac-

Fig. 1 • Protruding tongue, edema and discoloration of left side of face and lacerations resulting from automobile accident

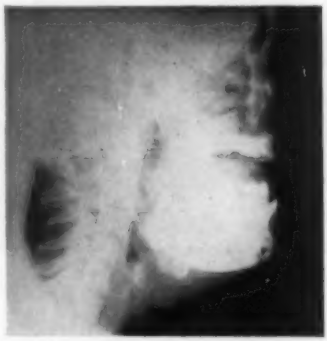

Fig. 2 • Preoperative roentgenograms reveal bilateral, compound fracture with considerable displacement of parts, left side of mandible tipped laterally and rotated

tured ends, the parts were approximated and wires (24 gauge stainless steel) were passed through and turned to hold the fractured segments in position. The muscle and subcutaneous tissues were closed with chromic interrupted sutures. Skin sutures were inserted. A dressing was placed, and a pressure bandage applied.

Manipulation and fixation of the anterior fracture were delayed for 48 hours. Ice packs were applied postoperatively to the left angle of the mandible.

On February 5, under thiopental sodium, the anterior fractured parts were manipulated into position, and the right and left halves of the arch bar were wired securely together. Occlusion was obtained with the maxillary denture, and elastic traction was established.

Postoperative roentgenograms showed satisfactory alignment (Fig. 3).

On February 8, the skin sutures were removed. Recovery was normal. On February 16, the patient was discharged. She continued to be seen at the office.

The elastic traction was removed about two weeks later, and an appliance was made to be worn on the mandible to permit function and relieve intermaxillary fixation. At this time, clinical and roentgenographic examination revealed the necessity of removing the four anterior teeth and the right cuspid. These teeth

Fig. 3 • Postoperative roentgenogram shows fracture reduced

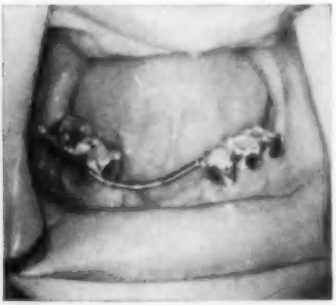

Fig. 4 • Orthodontic type appliance inserted to maintain segments and cause continuous expansion action and anterolateral thrust of left side of body of mandible

Fig. 5 • Patient in February 1954, one year after start of treatment. Roentgenogram shows satisfactory union

were considerably elevated from the sockets, and retention was maintained only by tissue attachment. Bony regeneration appeared in the regions of contact along the midline.

On the morning of March 3, the denture was removed, and an impression taken of the mandibular teeth. On the afternoon of the same day, under regional anesthesia, the four

anterior teeth and the cuspid were removed, and an appliance cemented into position. This unit was made of bands which fitted around the right bicuspids and the first molar, and on the left side, around the cuspid and bicuspids. A bar of heavy gauge wire was inserted into the attached tubes and soldered onto the band units. This bar was enclosed in a stainless steel expansion spring and placed from the labial aspect on the right side to the lingual aspect on the left. Purpose of this appliance, besides maintaining the segments, was to cause a continuous expansion action plus an anterolateral thrust of the left side of the body of the mandible (Fig. 4).

On April 10 the bands and expansion bar were removed; clinical and roentgenographic examination revealed satisfactory union. Ten months later, on February 2, 1954, roentgenographic examination was completed (Fig. 5).

Conclusion • A fractured mandible was treated by open reduction. The maxillary denture was used as an occlusal guide. The use of an orthodontic type appliance had value in maintaining alignment even though the patient was an adult.

1566 Acushnet Avenue

LOCATION OF ROOT CANALS THROUGH PHOTOGRAPHY

By George S. Dworkin, D.M.D., Worcester, Mass.

One of the major problems a dentist has in posterior root canal work is to determine the pathways of the canals. It is difficult to tell at times whether the canal bifurcates, joins another near the root or perhaps has auxiliary canals.

This information can be obtained by making a contact print of the roentgenogram with an automatic electric eye machine or with an ordinary enlarger on glossy paper. The procedure is based on the premise that a white line is more easily seen on a dark background than a dark line is on a white background.

Up to now dentists have considered the roentgenogram a negative. One photographer stated he could not print photographs from a set of roentgenograms. He claimed that the roentgenograms were positives, and negatives had to be made from them before prints could be obtained. For example, in Figure 1, a negative (left) had to be obtained from the roentgenogram before the photograph (right) could be printed.

This negative looked like the roentgenogram itself except the blacks and whites were reversed. Interestingly, the previous black root canals in the roentgenogram, which were

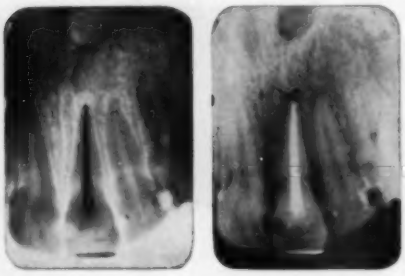

Fig. 1 • Negative (left) of roentgenogram must be made before print (right) can be obtained when usual method of reproduction is used

vague in outline and form, stood out startlingly when reproduced in white. If such a photograph could be made so that the root canals would be white, their structure and detail could be studied more clearly.

It was found that printing the roentgenograms by an automatic electric eye enlarger machine or a simple enlarger machine on Velox F glossy paper gave the desired result. The button of the roentgenogram must be up (the roentgenogram reversed) in order to get the right side up on the photograph. Additionally, the areas to be studied must be highlighted. Each photograph should be put in a separate envelope when it is taken from the dryer so that it is not scratched or rubbed.

As seen in Figure 2, the molar to be studied is highlighted at the expense of the bicuspid. The photograph shows there are only two canals in the mesial root of the molar. However, each canal has two bifurcations, which join at different levels. Therefore, there may be four openings from the pulpal chamber.

Figure 3 shows an upper right first bicuspid with two canals which end not apically but distally above the apical third of the root into what appears to be an infected area.

Because of the superimposition of roots, photographs of the upper molars are difficult to obtain. However, if a clear picture is obtained such as that of Figure 4, the three roots can be seen. There is a bifurcation in the canal of the mesial root, one branch of which seems to end not at the apex but in the bifurcation of the three roots. Two canals can be seen on the lingual root.

Much work remains to be done in this new field. The author believes that this work is just an introduction, and further research might demonstrate the usefulness of this method not only for the study of teeth, but for different regions of the body as well.

265 Main Street

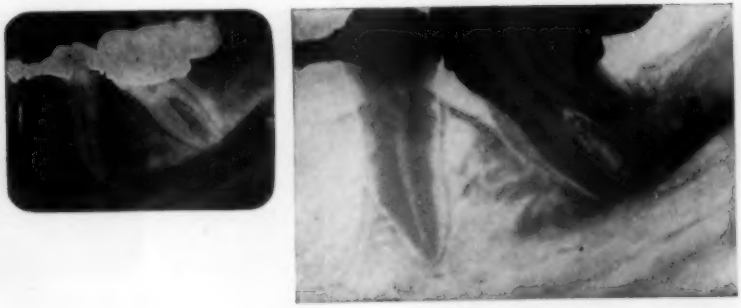

Fig. 2 • In contact print (right) made from roentgenogram (left) molar to be studied has been highlighted at expense of bicuspid

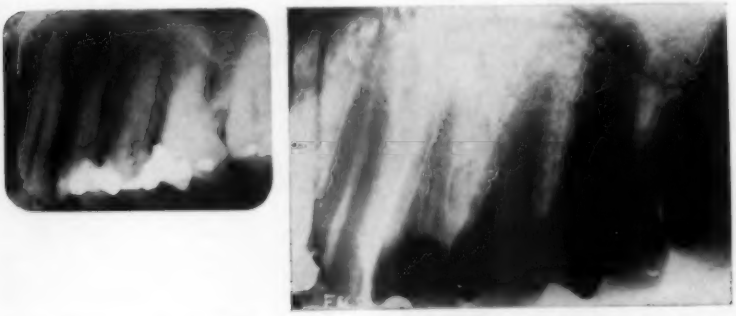

Fig. 3 • Contact print (right) shows first bicuspid with two canals ending distally above apical third of root

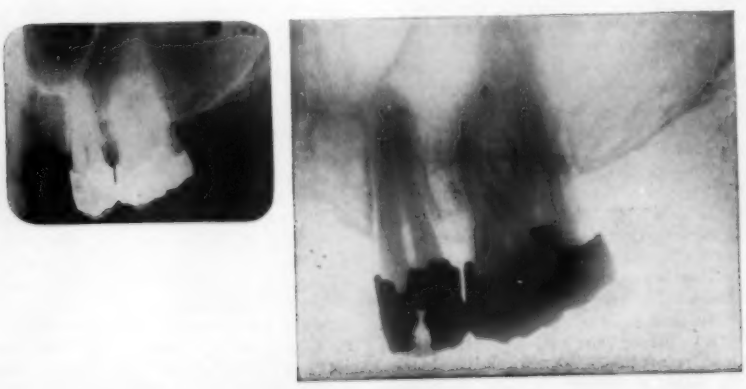

Fig. 4 • Contact print (right) of roentgenogram (left) produces clear picture of upper molars

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Editorials

Recent rulings of Federal Trade Commission improve relations between profession and craft

The rough weather which of late has ruffled the business relations existing between the dental profession and the dental craft has taken a turn for the better (see the statement of the Board of Trustees on the amendment of the *Trade Practice Rules,* page 263.

Thanks to the skill of the Council on Dental Trade and Laboratory Relations of the Association, the cooperation of the National Association of Dental Laboratories and an understanding Federal Trade Commission, the first break in the storm clouds came on June 14, when the Federal Trade Commission issued certain amendments to the *Trade Practice Rules for the Commercial Dental Laboratory Industry.* These amendments eliminated the terms "design" and "occlusion" and other objectionable terms from the text and also extended the jurisdiction of the *Rules* to include the unethical as well as the ethical dental laboratories.

The second break came on July 10 when the Federal Trade Commission issued a statement asserting that "nothing in these rules or in their promulgation is to be construed as modifying applicable Dental Practice Acts enacted by the states or in effect in the District of Columbia." Thus it would appear that for all practical purposes the four objectives sought by the House of Delegates of the Association have been achieved. Both the dental profession and the dental craft can now go forward in the development of harmonious and efficient relationships, including the establishment of training programs for technicians, the accreditation of dental laboratories and other plans for the improvement of dental health.

The success of such plans cannot be achieved by working only on the national level. Work and cooperation are also necessary on the state and local levels. This is what the Board of Trustees had in mind and embodied in the concluding paragraph of its statement issued July 13:

> The Board of Trustees believes that the concern evidenced in many quarters about the development of acceptable *Trade Practice Rules* has been successful in focusing the attention of the dental profession on the many problems which are inherent in the relation of the dental profession to its adjuncts, the dental laboratory and the dental laboratory technician. The Board of Trustees emphasizes that the development of sound relations must have the continuing study of the constituent and component societies and must be brought to the attention of every practicing dentist. If sound relations exist at these levels, the dental profession and the dental laboratory craft will both enlarge their capacities for service.

Seven innovations planned for the ninety-eighth annual session in Florida's "Magic City" of Miami

Three years ago, Miami was the site of the largest meeting of the Association up to that time. This year's annual session in Florida's "Magic City," November 4 through November 7, should be even better attended. Not the new hotels but the innovations at the scientific session will be the chief attraction for Association members and their guests.

In the past year the Council on Scientific Session has undertaken an extensive review of the function and purpose of the scientific session, and has instituted several basic changes in the planning and structure of the program. All are designed to provide a more integrated, more comprehensive treatment of scientific subjects and to maintain on a higher plane the continuing education of the dentist.

The Miami meeting will register a number of "firsts." For the first time: "(1) essay programs will be presented on Monday morning; (2) forums will cover either one full day or two full days; (3) clinics will be presented in Spanish for our South American colleagues; (4) most of the essays will be presented in panel form; (5) short discussion periods will follow the projected clinics; (6) within the motion picture program will be a clinic on the production of slides and motion pictures, and (7) reserve dental officers may obtain retirement credit points by attending stipulated portions of the scientific program.

A two-day forum on dental practice will cover such subjects as efficiency in the dental office, use of auxiliary aids, high-speed equipment and technics, and group practices, partnerships and the use of associates. All-day forums will be presented on complete denture construction and on local and general anesthesia in the dental office. There will be panels on x-radiation, on drugs, on treatment technics for the partially edentulous patient, on occlusion, and on restorative materials.

A special feature will be closed circuit color television (with television equipment and personnel supplied through the courtesy of Smith, Kline and French Labora-

tories), showing new technics in dentistry. The color television clinics will originate in the Dade County Dental Research Clinic and will be transmitted to two 500-seat rooms at Dinner Key Auditorium. Two-way communication will permit members of the audience to ask questions of the clinicians during the televised presentation.

The scientific program will be presented at Dinner Key Auditorium. The House of Delegates will meet at the Hotel Fountainebleau in Miami Beach. Special bus service between the auditorium and major hotels has been arranged.

Miami, in the southeastern section of the most southern state of the United States, is on Biscayne Bay at the mouth of the Miami River. It is the largest city in Florida, and, like many Florida communities, its recent growth has been a spectacle. Those coming to Miami for the first time will find it difficult to believe that in 1896, when it was incorporated, Miami was a little Indian trading post consisting of two dwellings, a storehouse and the small stone Fort Dallas, erected in 1836 during the Seminole Wars. By 1950 Miami's assessed valuation had topped $365,000,000.

Miami has a subtropical climate and vegetation. Along the bay for 15 miles runs a broad boulevard bordered with royal palms. Florida for centuries was the object of a search for the fabulous fountain of youth, and each year hundreds of thousands of Americans go to Miami to renew that search.

Accommodations will be available at special rates at some 40 hotels, among them some of the world's finest, for Association members and their guests. The hotels are in Miami, Miami Beach and in Bal Harbour (a new section just north of Miami Beach).

If you have not yet made reservations for yourself and family for the Miami meeting, better do so at once. Turn to page A-2 of this issue, fill out and mail in the hotel reservation application form, and prepare to profit from a memorable meeting of your national organization.

Aspirating before injecting rapidly becoming a routine procedure

Occasionally there appears in public print a highly sensationalized report of a death in a dental office supposedly caused by the injection of a local anesthetic. Such reports serve no good purpose by alarming unduly and unnecessarily the general public. They may, however, serve the good purpose of reminding the practitioner that anesthetic agents are drugs, that no drug is absolutely safe, that every drug is dangerous in overdosage and that the injection of an anesthetic solution is never entirely free from hazard.

The toxicity of an accepted local anesthetic agent is low when the solution is injected intramuscularly or subcutaneously because of the moderate rate of entrance of the drug into the circulation. If, however, the same amount of the solution is injected intravascularly, at the same rate, its toxicity is greatly increased. This increase is particularly evident if the agent is administered intravenously as the full effect of its potency is immediately felt systemically.

In order to avoid the hazards of inadvertent intravenous injection, most hospital standards long since have required that no injection be made without first withdrawing the syringe needle plunger to determine whether the point of the needle has been inserted in a blood vessel. Many dentists have adopted the same precautionary procedure. All should do so.

Harris[1] points out that there appear to be three main reasons why aspiration before injection is not practiced more generally in dentistry: (1) some dentists think that, when a needle point is in a blood vessel, blood will enter or can be "teased" into a nonaspirating cartridge, (2) some dentists believe—since so little on the subject has appeared in the literature—that the incidence of penetration of a blood vessel is insignificant in dental injections, and (3) many dentists underestimate the hazards of intravascular injection. Until these misconceptions are corrected, many dentists will continue to subject their patients to unnecessary risk and themselves to unnecessary trouble.

Studies in which an aspirating type of syringe was employed have shown that a blood vessel is penetrated in an average of over 3 per cent of injections.[1] Another investigator has reported informally that he has found the incidence of positive aspiration to be as high as 8 per cent.

If it is assumed that the incidence of intravascular penetration is about the same when aspiration is not practiced, it follows that dentists may inadvertently inject local anesthetics directly into the blood stream of 2 to 8 patients in every 100 to whom a local anesthetic is administered.

A fine gauge needle should not be used when aspiration is practiced. The use of a fine gauge needle may prevent the ready withdrawal of blood even when the point is within a vessel of considerable size. Unless the lumen of the needle is sufficiently large, false negative results may be observed on aspiration, and if the injection is performed in these instances, the solution will enter the blood stream.

The Council on Dental Therapeutics of the Association has adopted the following statement of policy relative to the avoidance of intravascular injection:

> The Council on Dental Therapeutics urges the practice of aspiration routinely before the injection of local anesthetics in order to determine that the needle has not penetrated into a large blood vessel. The Council believes (1) that with equipment presently available, aspiration may be accomplished most effectively by employing a glass syringe (luer type); (2) that if this type of syringe cannot be used, then one of the aspirating type of cartridge devices should be substituted, and (3) that because it is difficult to aspirate blood through needles of small lumen, the injection needle should not be smaller than 25 gauge.

Although the incidence of fatalities attributable to the administration of a dental anesthetic is extremely low, every effort must be made to reduce it even lower. One method by which this can be done is for every dentist to make a standard practice of aspirating before injecting.

1. Harris, S. C. Aspiration before injection of dental local anesthetics. Scheduled for publication in Journal of Oral Surgery.

International Correspondence

NEWS FROM GREAT BRITAIN

W. Stewart Ross, past president of the British Dental Association, writes the following memorandum on the pros and cons of the National Health Service in Great Britain:

"So much has been written about the National Health Service in Great Britain that further notes would appear to be superfluous. It is perhaps germaine, however, to study briefly the general views of the dental profession vis-à-vis the Service, since at present the vast majority of dental surgeons in Great Britain participate in the scheme. It is partly on account of the recommendations of the McNair Committee—a Committee set up by the government to investigate the shortage of dental recruits—that the whole question of the service has been discussed anew by the British Dental Association.

"Briefly, the McNair Committee felt that a general review of the National Health Service was desirable since there was ample evidence of discontent among the profession.

"The whole question of reviewing the present machinery of the dental service was left in the hands of the general dental services committee—a standing committee of the representative board of the British Dental Association responsible for the welfare of the profession in the Service. They were further asked to study the alternative ways and means of participating in the National Health Service.

"After intensive work, this committee presented a comprehensive memorandum to the representative board of the British Dental Association for approval. The main conclusions of the report were that no practical alternatives existed to warrant a radical change in the conditions of Services as they exist today. In fact, a questionnaire sent to a representative group of practitioners working in the Service showed that the majority were in favor of the Service continuing in its present form.

"After considerable debate in the representative board, the recommendations made by the general dental services committee were rejected by a small majority, and it has been left to the Council of the Association to review the position further.

"It is unusual for recommendations made by an important committee to be rejected by the board, and many feel that the views of men representing the profession working in the Service should have been adopted. Nevertheless, there is no doubt that there is a strong body of opinion within the profession that feels the whole principle of remuneration by an itemized scale of fees should be scrapped and replaced by some other form, and so we find two diametrically opposite views in the profession—those that are broadly in favor of the continuance of the present form of remuneration, and those that feel that the present form of an itemized scale of fees will ultimately lower the standard of dentistry as practiced in this country. At first glance this would appear to be a paradoxical state of affairs, but the answer to this divergence of opinion within the profession is not hard.

"Take the average practitioner working in the National Health Service. There is such an acute shortage of dentists that the average practitioner, if he is prepared to work hard, finds little difficulty in filling up his diary for weeks and sometimes months ahead. He does not have to bother to send out accounts, he has no bad debts. He is paid regularly for his work by the Dental Estimates Board. For ordinary routine work he has complete clinical freedom and is the sole arbiter as to the necessary time and trouble which he takes over a particular item of work for which in any case he receives the same fee.

"Those who are against the scheme state that there is a premium on fast slipshod work. The dentist's income depends more on how much he does rather than on how well he does it. How else, they say, can one account for the fact that a newly qualified youngster, straight from dental school can command a salary of £2,000 per annum, sometimes plus commission, while the older practitioner with experience and accumulated knowledge and skill finds that his income drops year by year because he cannot work at the same speed. They fear, therefore, that such a state of affairs will eventually bring the profession into disrepute.

"These are some of the points which lead to a divergence of opinion in the profession. These are the problems which the British Dental Association will be expected to solve."

PARLIAMENT

On May 8, the House of Commons debated on the second reading of the National Health Service Contributions Bill, which would increase the weekly contributions paid by insured persons and then would be diverted to offset the cost of maintaining the National Health Service.

The Minister of Health outlined the steady increase in the cost of the National Health Service since 1948. He said the government had decided that this growing financial burden was more than the taxpayer could reasonably be expected to bear and he suggested that no government could allow any particular service to impose a completely unlimited annual charge on the Exchequer.

He expected that it would have been possible to reduce the scope of the service by removing some part of it, perhaps the dental service from the National Health Service. Alternatively, it would have been impossible to impose further charges upon the patients.

The government had, however, decided against any of these alternative courses and had come to the conclusion that the proper course was to increase the direct contribution paid by insured persons to the National Health Service in accordance with the rise in earnings and costs.

ITEMS OF INTEREST

The University of London was pleased to welcome George Paffenbarger who gave a most interesting lecture on "The Transfer of Research Findings in Dental Materials to the Practice of Dentistry" and Professor R. Massler who spoke on "Dentistry for Children—Histological Background to Some Clinical Problems."

The death of Arthur Bulleid on May 26 will be deeply felt by his professional colleagues and friends all over the international dental world.

His professional life was divided between private practice, both in dentistry and bacteriology, and his hospital and school work. His passing will be especially mourned by the many who received their training at Guy's Hospital Dental School in the last 35 years. Arthur Bulleid will always be remembered as a man of principle who had a kind word to say of everyone, a modest man and a good friend.

G. H. Leatherman,
D.M.D., F.D.S., R.C.S., F.A.C.D.

NEWS FROM ARGENTINA

There has been a change in the position of dean pro tem of the Facultad de Odontológia de Buenos Aires. M. M. Indart has been designated to this post and Isaías Guitler has been appointed general secretary. The period of reorganization continues, particularly in regard to election of the professors of various departments.

The XIII Jornadas of the Asociación Odontológica Argentina will be held October 14-17. It is estimated that 180 scientific presentations will be made.

A new board of directors has been elected by the Círculo Odontológico Santafesino as follows: Ewaldo C. J. Schneider, president; Máximo P. Ledesma, vice-president; Anibál C. Filiberti, secretary; José N. Scarafia, assistant secretary; Edelmiro R. Fenés, treasurer and Pedro Giscafré, assistant treasurer.

August 26-31 are the dates of the IX Congreso de Odontólogos de Gendarmería Nacional y Primeras Jornadas Odontológicas de la Patagonia, to be held in San Carlos de Bariloche, Río Negro. Scientific sessions include lectures, table clinics, round tables and discussion groups. The organization committee includes Germán J. Storni, president, and Andrés P. Sola, Jesús D. Fanjul, Adolfo Testa de Madrid and José Sebastián Quirch, assistants.

Headquarters address of the Sociedad Argentina de Hipnodoncia is Avenida de Mayo 1229, Buenos Aires.

Ricardo A. Crespi

STATEMENT OF BOARD OF TRUSTEES ON AMENDMENT OF "TRADE PRACTICE RULES"

The Board of Trustees of the American Dental Association met in special session on July 13 in the Central Office, Chicago. The session was called by President Harry Lyons in accordance with the directive of the 1956 House of Delegates to review the Federal Trade Commission's decision on amendments of the *Trade Practice Rules for the Commercial Dental Laboratory Industry*. The amended *Rules* were issued by the Commission on June 14. The Board, by unanimous vote, adopted the following statement:

In complying with the directive of the House of Delegates, the Council on Dental Trade and Laboratory Relations sought four amendments to the *Rules* at the open hearing which was held by the Federal Trade Commission in Chicago on February 4, 1957 (J.A.D.A. 54:398 March 1957). The four amendments sought were:

1. Deletion of the words "design" and "occlusion";
2. Extension of the jurisdiction of the *Rules* to include the unethical as well as the ethical segment of the dental laboratory industry;
3. Elimination of certain technical language which dealt with advertising or promotional allowances and discriminatory services which the Association contended had no "meaningful application to transactions to which a dentist is party";
4. Statement of the adjunctive relation between dentists and dental laboratory technicians as established by state dental practice acts.

The amended *Trade Practice Rules* incorporate three of the Association's four recommendations. The Board of Trustees is of the opinion that these amendments meet the requirements of the House of Delegates, particularly the elimination of the terms "design" and "occlusion" which are nowhere used in the amended *Rules*. The Board of Trustees is also of the opinion that the extension of the *Rules* to include unethical dental laboratories is a major advance and will assist in carrying out the directive of the House of Delegates that the Association "assist in the utilization of the *Rules* to eliminate illegal dental practice by illegal and unethical dental laboratories engaged in interstate commerce."

The amended *Rules* as issued did not comply with the Association's request that the *Rules* make reference to the adjunctive relation which exists between dentists and dental laboratory technicians under the state dental practice acts. The Council on Dental Trade and Laboratory Relations immediately requested special counsel retained by the Association, Mr. Renah Camalier, of Washington, D.C., to file a statement with the Federal Trade Commission asking for further consideration of the Association's recommendation on this point.

On July 10, Paul M. Cameron, Chief, Trade Practices Division, Federal Trade Commission, addressed the following letter to Mr. Camalier:

> Your letter of July 8, addressed to Commissioner Secrest has been referred to this office for reply.
>
> The rules for the Commercial Dental Laboratory Industry promulgated on November 4, 1955, and amended on June 14, 1957, like all rules for industries, are interpretative of laws administered by the Federal Trade Commission.

It is believed that nothing in these rules or in their promulgation is to be construed as modifying applicable Dental Practice Acts enacted by the States or in effect in the District of Columbia.

In accordance with your request, permission is granted to publicize this letter to members of the industry.

The Board of Trustees, on the basis of competent legal advice, is of the opinion that the Commission's definite statement on the inability of the *Rules* to modify any state dental practice act meets the requirements established by the House of Delegates. The Board of Trustees, therefore, on the recommendation of, and in concurrence with, the Council on Dental Trade and Laboratory Relations, has voted to accept the amended Rules of June 14 and the Commission's letter of July 10 as fully meeting the conditions laid down by the House of Delegates.

In seeking amendment of the *Rules,* the House of Delegates had solicited the support of the National Association of Dental Laboratories "as an evidence of good faith in the maintenance of sound relations between the profession and the dental laboratory craft." The Board of Trustees is pleased to report that the amendments sought by the American Dental Association were supported by the National Association of Dental Laboratories at the February 4, 1957, hearing.

In accepting the amended *Rules,* the Board of Trustees has directed the Council on Dental Trade and Laboratory Relations to investigate the best methods under which the *Rules* could be utilized by appropriate agencies in the elimination of illegal dental practice. The Council was also directed to maintain a careful watch for the possible abuse of the *Rules,* such abuses to be reported immediately to the Board of Trustees for appropriate action.

The Board of Trustees wishes to express appreciation to the Council on Dental Trade and Laboratory Relations for achieving a successful solution of a complex and difficult problem; to Mr. Renah Camalier who served as special counsel; to the many members of the Association who furnished technical information or testified to support the effort toward amendment.

The Board of Trustees believes that the concern evidenced in many quarters about the development of acceptable *Trade Practice Rules* has been successful in focusing the attention of the dental profession on the many problems which are inherent in the relation of the dental profession to its adjuncts, the dental laboratory and the dental laboratory technician. The Board of Trustees emphasizes that the development of sound relations must have the continuing study of the constituent and component societies and must be brought to the attention of every practicing dentist. If sound relations exist at these levels, the dental profession and the dental laboratory craft will both enlarge their capacities for service.

MEMBERS IN ATTENDANCE

President Harry Lyons presided at the July 13 meeting. Among those in attendance were the following: William R. Alstadt, president-elect; Eugene R. Westcott, first vice-president; Harold E. Cafferata, second vice-president; John W. Knutson, third vice-president; Harold Hillenbrand, secretary; C. Willard Camalier, assistant secretary; Louis M. Cruttenden, assistant secretary; H. B. Washburn, treasurer; Lon W. Morrey, editor, and the following members of the Board of Trustees: Howard B. Higgins, Paul H. Jeserich, Charles H. Patton, Edward R. White, Robert J. Wells, Arthur W. Easton, A. F. Schopper, Lewis W. Thom, John R. Abel, Percy T. Phillips and Clarence S. Renouard.

Roy F. Golden substituted for Harold M. Flickinger, who was unable to attend. Earl G. Jones, trustee of the seventh district, was detained by bad flight conditions from attending.

CONFER HONORARY DEGREE ON DR. HILLENBRAND IN LONDON

Harold Hillenbrand, secretary of the American Dental Association was awarded the degree Fellow in Dental Surgery of the Royal College of Surgeons of England on July 19 in London. The degree was conferred at the anniversary meeting of the faculty of the college.

MIAMI MEETING FEATURES FIRST TWO-DAY ESSAY FORUM

Plans for the first two-day forum ever held at an annual meeting of the American Dental Association have been completed, according to Charles S. Kurz, chairman of the Council on Scientific Session.

To be conducted in four sessions, beginning on the afternoon of Tuesday, November 5, and ending on Thursday, November 7, at noon, the forum in the form of panel discussions will be presented by 15 outstanding essayists.

Subject of the forum is "Dental Practice," and its theme is efficient, effective care for more patients. Presiding at the first session on efficient office administration will be Harry M. Klenda. Jay H. Eshleman, Philadelphia, will serve as moderator. Topics to be covered include general office administration, time and motion studies, examination, diagnosis and treatment planning, and study programs for the practicing dentist. Robert K. Stinaff, Akron, Ohio, Marvin E. Mundel, Milwaukee, Dr. Klenda and Saul Levy, Chicago, will serve as panelists.

Wednesday morning, Rulon W. Openshaw and Maurice J. Hickey will serve as chairman and moderator, respectively, for the session on dental auxiliaries—their present and future function in dental practice. Panelists George W. Glann, Des Moines, Iowa, Harry Moiser, Herinton, Kan., Donal H. Draper, Indianapolis and Mr. M. Jules King, St. Louis, will discuss the dental assistant, hygienist, technician and the business manager.

High-speed cutting instruments—advantages and problems, will be the topic of discussion on Wednesday afternoon when Herbert D. Coy will preside. Subjects will include clinical evaluation of modern high-speed cutting instruments, water and air coolants and the washed-field technic, and biological responses to high speeds. Clemens V. Rault, Washington, D. C., will moderate and Drexell A. Boyd, Indianapolis, Elbert O. Thompson, Salt Lake City and James J. Kennedy, Washington, D. C., will participate.

The final session of the forum will be held on Thursday morning. Harry M. Klenda will again preside and Clarence E. Rutledge, Richmond, Calif., will serve as moderator of the session on partnerships, groups and associates in dental practice. Topics will include social and economic changes affecting dental practice, legal and business arrangements in dental practice and use of associates in private practice and group practice. Panelists will be Joseph V. Kirby, Clayton, Mo., Mr. John Rooks, San Francisco, Glenn A. Thomas, Wichita, Kan. and Carlton Williams, San Diego. This session marks the first time in five years that the essay program will be offered on the final morning of the meeting.

The American Academy of General Practice has announced that dentists may earn up to seven and a half hours of membership credit by attending the one and two-day essay forum programs. Part of the requirements for membership in the Academy are 50 hours of postgraduate work.

PANEL PROGRAMS

Practical endodontic technics will be the subject of a panel program on Monday morning, November 5. This is the first time that an essay program will be presented on the first morning of the scientific session. Herbert D. Coy will pre-

side, Hume S. Powell, Richmond, Va., will moderate, and George Stewart, Philadelphia, M. B. Auerbach, New York and Harry Hartley, Indianapolis, will present papers. Subjects to be explored are endodontic management of anterior and posterior teeth and the pulpless tooth in rehabilitation of the mouth.

On Wednesday afternoon, November 6, Dr. Openshaw will preside at a panel discussion on dental treatment of the chronically ill. Donald J. Galagan, Washington, D. C., will moderate. Panelists Theodore G. Klumpp, M.D., New York, Paul K. Losch, Boston and Dayton D. Krajicek, Wadsworth, Kan., will discuss medical care and dental treatment of the child and elderly patients.

All scientific sessions will be conducted at the Dinner Key Auditorium, Miami.

SPANISH CLINIC

This year, the American Dental Association will offer, for the first time, one morning of projected clinics conducted entirely in Spanish. There will be no English translation of these clinics. More than 250 Spanish-speaking dentists from Central and South America are expected to attend the Miami meetings.

RETIREMENT CREDIT POINTS

Reserve dental officers of the Armed Forces who attend any three of eight approved essay panel programs will be able to earn three retirement credit points, according to Lt. Col. Crandall I. Koons, military general chairman. Those essay programs of the scientific session approved by the Armed Forces for credit are:

The dentist's role in disaster casualty care

X-radiation in the dental office

Treatment planning for the partially edentulous patient

Current status of drugs in dentistry

Oral surgery (two half-day sessions)

Indications for and use of the various restorative materials

High-speed cutting tools—advantages and problems

The military will assign men to register reservists at the individual approved programs.

A.D.A. MEMBERSHIP INCREASES 3,000 OVER LAST YEAR

An all-time high in membership in the American Dental Association was established on June 30 when the total reached 88,498. This represents an increase of almost 3,000 over the corresponding date last year.

In the various categories, active and life membership showed an increase of 2,088, for a total of 77,804. An increase of 730 to 10,455 student members also was recorded. Membership in other classifications is as follows: affiliate, 204; associate, 20 and honorary, 15.

$128,362.73 SETS NEW HIGH AS RELIEF FUND DRIVE ENDS

Contributions to the 1956-57 Relief Fund campaign, which ended June 30, amounted to $128,362.73, exceeding last year's record total by $13,401. This marks the fifth consecutive year that the drive surpassed the $100,000 quota established by the Council on Relief.

As in past years, the size of each society determined the amount of quota. Generally, there were two categories: less than $1,000 and more than $1,000. This year 49 constituent societies and the U. S. Public Health Service exceeded the amount set. Southern California, Nevada and Arizona doubled their quotas.

On a per capita basis, Alaska led in contributions for the second consecutive year with $365, an amount nearly eight times its quota. Tennessee again placed second with $5,330, almost quadrupling its goal.

In dollar volume New York, Southern California and Illinois repeated their standings of last year with contributions of $14,325.55, $10,822.95 and $8,679.25, respectively.

The smaller societies contributed $17,502.90, and the larger societies contributed $107,492.94. Contributions from the federal dental services amounted to $2,470.50, and donations from students, memorials and miscellaneous sources totaled $896.39.

The following table shows a breakdown of contributions and quotas by societies.

Constituent	Quota	Total Contribution
Alabama	$ 850.00	$ 1,668.50
Alaska	50.00	365.00
Arizona	340.00	685.50
Arkansas	540.00	726.15
California	3,900.00	5,295.00
So. California	4,800.00	10,822.95
Colorado	980.00	1,296.00
Connecticut	1,930.00	2,369.00
Delaware	150.00	241.00
Dist. of Columbia	760.00	1,483.00
Florida	1,480.00	2,136.00
Georgia	1,090.00	1,220.50
Hawaii	380.00	670.00
Idaho	280.00	345.00
Illinois	6,940.00	8,679.25
Indiana	2,240.00	2,789.50
Iowa	1,760.00	1,928.00
Kansas	1,000.00	1,183.00
Kentucky	1,170.00	1,754.44
Louisiana	1,020.00	1,195.20
Maine	440.00	750.00
Maryland	1,120.00	1,612.00
Massachusetts	3,620.00	3,762.50
Michigan	4,160.00	5,585.00
Minnesota	2,740.00	3,588.50
Mississippi	560.00	601.50
Missouri	2,420.00	2,720.00
Montana	370.00	589.00
Nebraska	970.00	1,198.50
Nevada	100.00	214.50
New Hampshire	310.00	323.00
New Jersey	4,010.00	5,522.25
New Mexico	250.00	397.00
New York	14,750.00	14,325.55
North Carolina	1,310.00	1,900.50
North Dakota	300.00	515.50
Ohio	4,920.00	5,577.20
Oklahoma	910.00	1,100.00
Oregon	1,330.00	1,480.00
Panama C. Z.	20.00	22.00
Pennsylvania	6,700.00	6,425.60
Puerto Rico	240.00	232.25
Rhode Island	550.00	879.00
South Carolina	440.00	435.00
South Dakota	310.00	542.00
Tennessee	1,340.00	5,330.00
Texas	3,260.00	3,216.50
Utah	510.00	703.50
Vermont	180.00	279.00
Virginia	1,230.00	1,419.00
Washington	1,880.00	2,634.50
West Virginia	720.00	946.00
Wisconsin	2,890.00	3,021.00
Wyoming	170.00	295.00
Federal Dental Services		
Air Force	580.00	526.50
Army	550.00	435.50
Navy	1,070.00	664.00
Public Health Serv.	210.00	459.00
Vet. Administration	900.00	385.50
Others		
Students		769.50
Memorials		25.00
Miscellaneous		101.89
Total	$100,000.00	$128,362.73

SULLENS PROMOTED; APPOINT MILLER ASSISTANT SECRETARY

The promotion of Reginald H. Sullens from assistant to associate secretary of the Council on Dental Education and the appointment of Benjamin F. Miller as assistant secretary of the Council were announced by Harold Hillenbrand, secretary of the American Dental Association.

Mr. Sullens became a full-time member of the Central Office staff in 1952, when he was appointed director of the Division of Educational Measurements of the

Benjamin F. Miller

Reginald H. Sullens

Council. He was promoted to the position of assistant secretary in 1953.

Mr. Miller joined the staff on June 24, 1957. As assistant secretary of the Council on Dental Education he will be concerned with publications of the Council and training programs for dental assistants and other auxiliary personnel. Mr. Miller earned a bachelor's degree from Allegheny College, Meadville, Pa., in 1939, and then returned in 1941 as an instructor in business English. Meanwhile, he gained some teaching experience during the interim while studying for his Master's degree at the State University of Iowa.

During World War II, he served as an instructor in Army administration at the adjutant generals' school. Prior to his discharge he was assigned to the task of establishing an educational program for reserve officer training by correspondence.

Most recently Mr. Miller headed his own building supply business in Meadville.

COUNCIL ANNOUNCES ADDITIONS CHANGES TO APPROVED LIST

At its meeting of May 23, the Council on Dental Education voted to give its full approval to the following school programs: the four year dental education program at the College of Medical Evangelists School of Dentistry, Loma Linda, Calif.; and the two-year dental hygiene programs at the University of Texas, Houston, and at the Caruth School of Dental Hygiene, Baylor University, Dallas, Texas. All three schools have just graduated their first senior classes.

The Council also voted to continue its full approval of the following education programs: the dental education program at the School of Dentistry, Loyola University, New Orleans, and the two year dental hygiene program at the Forsyth Dental Dispensary, Boston. Also voted continued approval were the dental education and the dental hygiene programs at Temple University, Philadelphia, as a result of a revisit to this institution in cooperation with the Middle States Association.

Additions and changes to the approved hospital education programs also were voted on during this meeting. As a result, the Council and its Committee on Internships and Residencies announce the approval of the following educational programs in hospitals:

Children's Memorial Hospital, Chicago
Straight internship in pedodontics
Veterans Administration Center, Wadsworth, Kan.
Rotating internship
Confederate Memorial Medical Center, Shreveport, La.
Residency in oral surgery (24 months)
Queens General Hospital, Jamaica, N. Y.
Straight internship in oral surgery
Cleveland City Hospital, Cleveland
Residency in oral surgery (12 months)
Allegheny General Hospital, Pittsburgh
Residency in oral surgery (12 months)
Veterans Administration Medical Teaching Group Hospital, Memphis, Tenn.
Residency in prosthodontics (24 months)
Children's Medical Center, Dallas, Texas
Straight internship in pedodontics
M. D. Anderson Hospital and Tumor Institute, Houston, Texas
Residency in oral surgery (12 months)
Robert B. Green Memorial Hospital, San Antonio, Texas
Residency in oral surgery (12 months)
King County Hospital System, Seattle
Straight internship in oral surgery

Changes were made in the following educational programs previously approved by the Council:

Coney Island Hospital, Brooklyn, N. Y.
From: Mixed internship
To: Straight internship in oral surgery
St. Francis Hospital & Rehabilitation Institute, Pittsburgh
From: Rotating internship
To: Straight internship in oral surgery
Residency in oral surgery (12 months)

Provisional approval was granted to the second year of the residency in oral surgery at the Ohio Valley General Hospital, Wheeling, W. Va.

The Council on Dental Education has now approved training programs in 189 hospitals.

J.A.D.A. MICROFILM EDITION AVAILABLE TO READERS

The JOURNAL OF THE AMERICAN DENTAL ASSOCIATION is now available on microfilm. By arrangement between the Association and University Microfilms, Ann Arbor, Mich., readers interested in this space-saving method of reproduction may obtain a full year's publication of THE JOURNAL on a single roll of film for the cost of binding the paper editions. Microfilm makes possible storing of THE JOURNAL in a space estimated at 1 to 2 per cent of that required for the originals. Those interested in the microfilm edition may write Mr. Stevens Rice, University Microfilms, 313 N. First St., Ann Arbor, Mich.

FIRST HOSPITAL DENTISTRY INSTITUTE-WORKSHOP HELD

Improvement of patient care in hospitals through improvement of dental services was the theme of the first institute-workshop on hospital dentistry held June 17-19 in Washington, D.C. It was conducted by the American Hospital Association cooperatively with the American Dental Association and was co-sponsored by the American Medical Association.

The 109 participants, representing 28 states and Canada, learned of the various aspects of dental care in hospitals through lectures, a panel discussion and a workshop on professional problems. Topics such as the governing board's responsibility for patient care, the function and organization of the hospital staff and the interdepartmental relationships, educational programs in dentistry in hospitals and the organization, administration and scope of dental departments and services in hospitals were included on the agenda.

On the last day of the conference, the participants were divided into workshop groups and suggestions for approaches to the solution of existing problems were made. Reports of each workshop discussion were presented to the entire delegation.

The second institute-workshop has been tentatively scheduled for June 2-5, 1958, in Chicago, according to Gerard J. Casey, secretary of the Council on Hospital Dental Service.

LATEST EDITION OF DENTAL LITERATURE INDEX AVAILABLE

The second quarterly issue of the *Index to Dental Literature,* covering the period of January to June, 1957, is available from the Central Office. Published cumulatively four times a year, the *Index* contains over 5,500 listings arranged alphabetically under more than 11,000 author and subject entries. The subscription rate is $20 a year.

TWO NEW PUBLICATIONS AID DENTIST SEEKING LOCATION

The graduating dental student or the dentist who intends to relocate will be aided in his determination by the facts contained in the 1957 editions of two pamphlets published annually by the American Dental Association's Bureau of Economic Research and Statistics, reports B. Duane Moen, director of the Bureau.

Distribution of Dentists in the United States by State, Region, District and County contains facts and figures on the total number of dentists in 1956, the population per dentist, the number of 1956 graduates, the per cent of population increase from 1940 to 1950, the estimated population for 1956, the per capita buying income, 1955 and the per capita retail sales, 1955.

Facts about the relocation of dentists in 1954 and 1955, the average income of dentists in 1955 by region and state, pro-

visions of state dental practice acts, requirements of state boards of dental examiners and state examination and registration fees are among those contained in the 1957 edition of *Facts About States for the Dentist Seeking a Location.*

Single copies of these brochures are available free of charge, on request, from the Bureau.

NEW PAMPHLET DESIGNED FOR EXTRACTION PATIENT

What to do After Extraction of a Tooth is the title of a new pamphlet published by the Bureau of Dental Health Education of the American Dental Association. Designed to give the patient some information on care procedures after an extraction, this leaflet serves as a reinforcement of the dentist's oral instructions.

Prices for this single-fold leaflet are: 50 copies, $1.00; 100 copies, $1.50; 500 copies, $6.25. Orders should be accompanied by remittances and addressed to the order department of the Central Office.

"ACCEPTED DENTAL REMEDIES" IS PUBLISHED IN SPANISH

Medicación Odontológica, a Spanish edition of the 1955 edition of *Accepted Dental Remedies,* has been published by the Asociación Odontológica Argentina. Permission for the translation was granted by the Board of Trustees of the American Dental Association in 1954.

Juan Chaneles, ex-professor of pharmacology and therapeutics of the University of Buenos Aires, prepared the translation and wrote the introduction to the Spanish edition.

"The seal of *Accepted* is the most valued guarantee of the elements employed in dental therapeutics and the best defense against charlatanism," states Prof. Chaneles in a preface. "It guards against the dangers of exaggerated claims and at the same time is of assistance to those industries based on honest procedures.

"In presenting this version to Spanish-speaking dentists and students of dentistry, we believe we are contributing substantially to the progress of the profession. The correct concepts accepted by their colleagues in the United States will be of great assistance to Spanish-speaking dentists in their work."

PUBLIC INFORMATION BUREAU PUBLISHES PUBLICITY GUIDE

A 24-page, 10-chapter handbook, *Publicity for Dental Societies,* which explains the nature of publicity and how dental societies can use it to promote public relations effectively, has been issued by the Bureau of Public Information of the American Dental Association. The material covers such topics as what makes news, preparation of news releases, photographs and measuring results.

Copies of this guide are being sent to secretaries and executive secretaries of state and local dental societies. Additional copies are available without charge to authorized representatives of societies.

DENTAL ASSISTANTS' TRAINING TOPIC OF OCTOBER WORKSHOP

Increasing interest on the part of members of the dental profession and the American Dental Assistants Association in evaluating the educational needs of the dental assistant has prompted the Council on Dental Education of the American Dental Association to sponsor a workshop on the education and certification of dental assistants on October 2-4, at the Central Office.

Purpose of the conference will be to lefine the duties and responsibilities of the dental assistant in order to develop educational standards. Resource information will be available for the discussions.

Dental and dental assistant educators and officials of the agencies of the American Dental Assistants Association as well as other interested parties are being invited to attend this conference which will be limited to 60 participants. Advance registration will enable the distribution of resource material prior to the meeting.

SUBSCRIPT • The dates of the second conference of Council officers of the American Dental Association have been changed to December 16-18 because of a conflict with the dates of the Greater New York Dental meeting.

Legislation

PRESIDENT SIGNS DRAFT, APPROPRIATION MEASURES

Two measures of interest to the dental profession, passed by Congress in June, have been signed by President Eisenhower and became effective as of July 1.

Public Law 85-67, a dentist-physician draft bill, repeals the Doctor Draft Act of 1950 by relieving physicians and dentists of a double liability to serve in the Armed Forces. Under the old measure, the selective service was provided with authority to draft doctors up to the age of 46. Now a dentist or physician faces the same liability as other citizens between the ages of 18 and 35.

The other measure signed by the President is a bill containing an appropriation of $6,430,000 to support the dental activities of the U. S. Public Health Service. Funds appropriated for dental health and research activities during the fiscal year which began July 1, 1957, represent an increase of more than $400,000 over last year's appropriation.

INTRODUCE BILL TO ISSUE STAMP FOR A.D.A. CENTENNIAL

On June 24, Sen. Frank Carlson (R., Kan.) introduced a bill to provide for the issuance of a special postage stamp to commemorate the 100th anniversary of the American Dental Association in 1959. Arrangements for the introduction of this bill were made by the Council on Legislation through C. Willard Camalier, assistant secretary of the Association.

Less formal congressional action in the form of a spontaneous letter to the Postmaster General came from Rep. George P. Miller (D., eighth district, Calif.) who wrote, in part:

> We have had commemorative stamps for physicians, lawyers, engineers, chemists, and most other professional walks of life except the dental field. I am sure you will agree with me that dentists have rendered a most worthy service to our country.
>
> Dental education had its start in the United States. If we are to reap the full benefit of discoveries developed through years of patient research and study, the science of dentistry must be encouraged.

PUBLIC DENTURIST BILL AGAIN DEFEATED IN ILLINOIS

In its closing sessions, the Illinois state legislature repeated its actions of two years ago by defeating a bill which would have set up a class of licensed dental laboratory technicians who would be authorized to provide dentures directly to the public. The public denturist bill was ordered stricken from the rolls, along with several other measures, during the final week of the legislative session.

VETERANS AFFAIRS COMMITTEE FAVORS SALARY INCREASES

On July 11, a bill which would provide for certain adjustments in organization and an increase in salary levels in the Department of Medicine and Surgery of the Veterans Administration was reported on favorably by the House Veterans Af-

fairs Committee. If enacted by Congress during the current session, this bill, H.R. 6719, would provide three important modifications to the present law.

The first two modifications apply to the organizational structure of the department. The first calls for a reduction in the number of assistant chief medical directors, with the stipulation that the basic proviso in the present statute be retained. This proviso requires that one assistant chief medical director be a dentist. The second modification provides for a new administrative echelon.

An increase in the pay range of dental and medical personnel employed by the Veterans Administration is the third modification of the new bill. However, this modification also calls for a reduction in the salary increment now authorized to dentists and physicians who are specialists.

C. Willard Camalier, assistant secretary of the American Dental Association, who testified on this bill in June reported that the Association favors the bill but questioned that portion which would reduce the 25 per cent salary increment granted a specialist under the provisions of the current statute.

Dental Societies

JOURNALISM COUNCIL FOSTERS PACIFIC COAST WORKSHOP

A one-day regional editorial workshop for those interested in writing for dental or medical publications will be conducted on Sunday, August 18, in San Diego, prior to the Pacific Coast Dental Conference which convenes on August 19.

Speakers for the workshop will include J. P. Gray, M.D., American Medical Writers' Association; Dr. Carl Johnson, director, technical information, Naval Electronics Laboratories; Bryant Evans, science editor, Copley Press and Claron Oakley, director and editor, Audio Digest Foundation. J. C. Almy Harding, chairman of the Council on Journalism, will serve as moderator.

Scene of the meeting, scheduled to begin at 1 P.M., will be the Kona Kai Club on Shelter Island in San Diego Bay. Eight dollars covers registration fees, lectures, dinner and incidentals.

Additional information may be obtained from J. C. Almy Harding, 311 Nutmeg St., San Diego, Calif.

HOLD MID-CONTINENT DENTAL CONGRESS IN NOVEMBER

November 17-20 are the dates of the Mid-Continent Dental Congress to be held at the Chase-Park Plaza Hotel in St. Louis. The highly diversified program includes evening table clinics.

Full information may be obtained by writing to James E. Brophy, executive secretary, 8013 Maryland Ave., Clayton 5, Mo.

NAME STATE AND TERRITORIAL ASSOCIATION OFFICERS

During a conference with the U. S. Public Health Service and the Children's Bureau, held in Washington, D.C., June 19-21, the Association of State and Territorial Dental Directors elected new officers as follows: William A. Jordan, Minneapolis, president; Harry Ostrow, Washington, D.C., president-elect; Thomas W. Clune, Providence, R. I., vice-president, and David Wallace, Richmond, Va., secretary-treasurer.

Harry Lyons, president of the American Dental Association, addressed the annual session of the Hawaiian Territorial Dental Society on June 24 at the Reef Hotel in Honolulu. Pictured with Dr. Lyons is William Yuen, president of the Society.

MISSISSIPPI COMPLETES DENTAL CONFERENCE PLANS

Final arrangements for the conference on oral diagnosis, roentgenology and treatment planning, to be held August 21-22 at the University of Mississippi, culminate a year's planning. Sponsored by the Northeast Mississippi Dental Society, the Mississippi Dental Association, the Mississippi State Board of Health and the School of Medicine, University of Mississippi, the meeting will present outstanding clinicians in each of the areas treated.

Dental Education

COMMISSION STUDIES DENTAL MANPOWER NEEDS IN SOUTH

Members of the Commission on Dental Education in the South held their second meeting in Atlanta, Ga., on July 8 and 9 to study a report on dental manpower needs in the South and to make recommendations for the form of the final report.

This Commission, established by the Southern Regional Education Board for a period of one year, is composed of 15 dental and medical leaders in southern education, among them Harry Lyons, president of the American Dental Association. Russell Poor, provost of the University of Florida Health Center in Gainesville, is chairman of the Commission.

The Council on Dental Education of the American Dental Association was represented at this meeting by Carl Laughlin, chairman, Shailer Peterson, secretary and Philip Blackerby, Jr., mem-

ber. Dr. Blackerby also is associate director of the W. K. Kellogg Foundation. The U. S. Public Health Service was represented by Walter J. Pelton, chief of the division of dental resources.

Following is a statement of purpose and scope of the study as adopted by the Commission:

The study will develop a factual base on which states and institutions, individually and cooperatively, can act with assurance to provide undergraduate and graduate dental education of sufficient quality, scope and capacity to meet the region's present and future needs for dentists, including specialists and teachers and dental hygienists. The study will consider present and future needs and demand for dental services on the one hand, and the quality, scope and capacity of dental education to train enough dentists and dental hygienists to provide such services, on the other. It will make recommendations for action by states, schools, national, state and local professional organizations of dentists, dental hygienists, the Southern Regional Education Board and other groups.

On August 13-14, the Commission will again meet in Atlanta with representatives from the dental societies of the 16 states with which the Southern Regional Education Board has agreements. At this time the report will undergo a final appraisal before its formal issuance, scheduled for some time before the end of the present calendar year.

ORTHODONTICS OFFERED AT HARVARD IN SEPTEMBER

Postgraduate work in orthodontics for the general practitioner has been scheduled by the Harvard School of Dental Medicine for the week beginning September 9, under the direction of Melvin I. Cohen, Lennard T. Swanson and Julian M. Rothblatt.

Fees are $125 for tuition and $5 for registration. Application forms are available from the Harvard School of Dental Medicine, Courses for Graduates, 25 Shattuck St., Boston, 15.

TUFTS TO HOLD POSTGRADUATE REFRESHER COURSES

Tufts University School of Dental Medicine will offer three postgraduate refresher courses beginning this fall.

Frank A. Eich, assistant professor of prosthetics, will conduct a class in crown and bridge prosthesis for the general practitioner for six Mondays beginning on October 21. Tuition for this course, which is limited to six, is $200.

On February 26, 1958, Balint Orban, professor of periodontics, Loyola University, Chicago, will conduct the first of three classes in periodontics during which he will present his idea of the most recent

Two former deans of the University of Michigan School of Dentistry returned to campus in June to join the present dean in ceremonies commemorating the 75th anniversary of the founding of Delta Sigma Delta fraternity. (L. to r.) Marcus L. Ward, who was dean from 1916 to 1934; Paul H. Jeserich, current dean and Russell W. Bunting, who was dean from 1937 to 1950. One of the high lights of the week end was the unveiling of a bronze memorial plaque which stands in front of the Alpha chapter house on the Ann Arbor campus.

During the 128th commencement exercises in June, (left) Howard R. Raper, Albuquerque, N. Mex., received from Indiana University's president, (right) Herman B. Wells, the alumni distinguished service award. Graduate and former faculty member of the Indiana Dental College, Dr. Raper is a past president of the Indianapolis Dental Society and, in 1950, was chosen by the New Mexico State Dental Society as "The Dentist of the Half-Century." He is widely known for his work in roentgenography.

developments in the field. Tuition for this refresher course is $90, and enrollment is limited.

An eight-day postgraduate refresher course in crown and bridge prosthesis will be taught by R. Sheldon Stein beginning February 28, 1958. This is a participation course during which each student will construct a bridge for a patient. Tuition for the course, which is limited to eight, is $200.

ILLINOIS OFFERS TWO-YEAR COURSE IN CROWNS, DENTURES

Announcement of a two-year training program leading to the Master of Science degree has been made by the department of crowns and fixed partial dentures of the University of Illinois College of Dentistry.

Divided into two parts, the first nine months of this program consist of advanced postgraduate instruction in basic clinical and technical procedures and the principles of crown and bridge prostheses.

Successful completion of this program entitles the candidate to petition the faculty for admission to the graduate college where he will be assigned for one year of graduate training and research in a basic science.

The combined program leads to both postgraduate certification in crown and bridge, and, upon the completion of a thesis, a Master of Science degree in the basic science field selected.

FALL-WINTER PROGRAMS ANNOUNCED BY SCHOOLS

California • An eight-week general review course will be offered, beginning November 18, by the University of California Extension, Los Angeles. Lectures on 18 topics and demonstrations of laboratory technics and clinical procedures will be included. Inquiries should be addressed to the Extension at 815 S. Hill St., attention of J. Eugene Ziegler, head, extension dental program.

Michigan • Graduate and postgraduate courses to be offered during the 1957-58 school year at the W. K. Kellogg Foundation Institute, University of Michigan, Ann Arbor, will consist of 21 programs of study. A brochure containing descriptions of course content as well as information on tuition, requirements and living accommodations, is available from the office of William R. Mann, associate director of the Institute.

New York • Postgraduate and graduate courses in dentistry to be offered by the College of Dentistry of New York University for the 1957-58 terms are described in an 18-page pamphlet recently issued. The curriculum includes short intensive courses as well as courses longer in duration for both general practi-

tioners and those interested in specialties. The pamphlet, which includes an application blank, may be obtained by writing to the director of the postgraduate division, 209 E. 23 St., New York 10.

Ohio • The College of Dentistry of Ohio State University, Columbus, will offer 15 postgraduate courses during 1957-58. The first of these classes will start on October 14. With the exception of the course in dental hygiene, each session will be conducted for five consecutive days. A detailed schedule as well as information on tuition rates and application forms is available from the offices of the postgraduate division.

Ohio • Applications for enrollment in the curriculum of dental laboratory technology are being received by the Ohio State University College of Dentistry, Columbus. This course of study of the laboratory phases of prosthodontics extends over two academic years and leads to a certificate of graduate dental laboratory technologist. Further information can be obtained by writing to the chairman of dental laboratory technology at the University.

Virginia • A two-year postgraduate program leading to a certificate in pedodontics is being offered by the Medical College of Virginia, School of Dentistry, Richmond. The curriculum includes training in clinical pedodontics, growth and development, hospital dental care, cleft palate rehabilitation, cephalometrics and research. Letters of inquiry should be addressed to H. T. Knighton, director, graduate and postgraduate instruction.

Washington • The University of Washington School of Dentistry, Seattle, is offering a refresher course in practical periodontics from August 21-24. Saul Schluger, Jersey City, has been engaged as a special lecturer for this program. Tuition for the course is $100.00, half of which must accompany the application.

MEDICAL EVANGELISTS NAME FIVE TO DENTAL FACULTY

The College of Medical Evangelists, Loma Linda, Calif., has named five persons to faculty rank in the School of Dentistry, Keld Reynolds, dean of the faculties, announces. Those named are: Van Anspach, instructor in restorative dentistry; Mrs. Dorothy Foreman Beltz, lecturer in human relations; Irwin B. Golden, instructor in restorative dentistry; George MacD. Hollenback, associate professor of restorative dentistry, and Martin Gill Nelson, instructor in prosthodontia.

International

INTERNATIONAL FLUORIDATION EXPERTS TO MEET IN GENEVA

Water fluoridation will be the subject of a meeting to be held in Geneva, Switzerland, August 26-30. Members of an Expert Committee on the Public Health Aspects of Water Fluoridation will convene "to review the present knowledge and to make recommendations which may later become policy of the World Health Organization," according to Carl L. Sebelius of Nashville, Tenn., WHO dental officer. Formal papers and panel discussions by international experts on developments in water fluoridation in their respective countries will be included on the agenda.

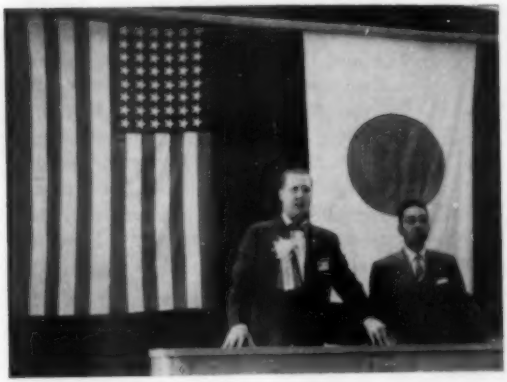
International authorities invited to the meeting include Yngve Ericsson, associate professor of cariology and acting head of the department of operative dentistry, Royal School of Dentistry, Stockholm; Jean Forrest, senior dental officer, Ministry of Health, London; Paulo da Silva Freire, chief of the dental section, Servicio Especial de Saude Publica, Rio de Janeiro; A. J. Held, Institut de Medicine Dentaire, University of Geneva; Harold C. Hodge, professor of pharmacology and toxicology, University of Rochester, School of Medicine and Dentistry,

Rochester, N.Y.; John W. Knutson, assistant surgeon general and chief dental officer, U. S. Public Health Service, Washington, D.C., and K. L. Shourie, principal, Sir C.E.M. Dental College and Hospital, Bombay.

PRESIDENT-ELECT ALSTADT COMPLETES GOODWILL TOUR

W. R. Alstadt, president-elect of the American Dental Association, recently addressed two dental societies in Japan. First on his agenda was the Fifth Central Japan Dental Conference, sponsored by the American Stomatological Society of Japan. This Society, now three years old, is a professional study group composed of members of the Army, Navy and Air Force. D. J. Aubertine, San Francisco, also spoke on this program which took place late in April.

Dr. Alstadt delivered his second speech at the opening session of the Japan-American "Goodwill" Dental Convention at the Nippon Dental College, Tokyo. His remarks were translated by Rio Yamauchi, editor of the Japan Dental Association's journal.



W. R. Alstadt and Rio Yamauchi

(Left to right): Col. William B. Simms, chief, oral surgery section, dental service, U. S. Army Hospital, Tokyo, and president of the American Stomatological Society of Japan; William Alstadt, president-elect of the American Dental Association and Capt. Victor A. LeClair, dental officer with the U. S. Navy in the Far East.

National Defense

ARMY DENTAL CORPS NAMES 24 LIEUTENANT COLONELS

The Army Dental Corps has announced selections for promotion to the permanent grade of lieutenant colonel for the following 24 majors:

R. H. Augsburger, S. K. Avery, S. W. Clapp, Jr., W. V. Cruzan, K. C. DeGon, P. O. Evans, C. A. Farrell, R. J. Farrell, H. A. Goodall, H. P. Haskins, W. B. Irby, F. R. Krug, H. B. Lafflitte, L. E. McKelvey, J. E. McNelly, J. M. Murphy, W. O. Orsinger, E. P. Quarantillo, R. P. Rogers, J. C. Sexson, K. W. Siegesmund, E. H. Smith, Jr., R. J. Talbot and H. Wilenzick.

Research

DENTAL SCHOOL RESEARCH INCREASES SIXFOLD IN YEAR

A sixfold increase in the number of dental research projects in dental schools has occurred within one year as a result of the sevenfold increase in the National Institute of Dental Research appropriation for research grants, F. E. Lyman, chief of the NIDR extramural programs, reports. All dental schools in the United States with the exception of one are now participating in the NIDR extramural programs, according to Dr. Lyman. Support for the programs is furnished by research grants, research fellowships and graduate training grants.

The percentage of dental schools active in the research grants program has risen from 50 per cent on June 1, 1956, to 90 per cent today. Only five dental schools do not have active grants; all but one of these schools, however, are participating in the fellowship program.

As of June 1, 1957, the number of NIDR active research grants stands at 265 as compared with only 51 just one year ago. These grants represent $2,686,903 as opposed to only $423,747 on June 1, 1956, stated Dr. Lyman, adding:

"Of the total research grant funds in 1957, 72 per cent has been awarded to dental schools as compared to 28 per cent to all other institutions supported in project research by NIDR. In 1956, 67 per cent of the funds ($284,350) was awarded to dental schools as compared with 33 per cent ($139,350) to all other institutions."

A.C.E. SELECTS COMMISSION TO SURVEY U. S. DENTISTRY

Impartial and critical studies of four areas—dental education, research, practice and health—will be conducted over a two-year period at a cost of $400,000 by the Commission on the Survey of Dentistry in the United States, according to an announcement by the American Council on Education. This survey, undertaken at the request of the American Dental Association, will assess the achievements, resources and potentialities of dentistry in the United States, to determine desirable areas of future development and to recommend methods for the better provision of an essential service to the American people.

The Council announced the complete membership of the Commission to be as follows: Arthur S. Flemming, president, Ohio Wesleyan University, Delaware, chairman of the Commission; Otto W. Brandhorst, secretary, American College of Dentists, St. Louis; George Bugbee, president, National Health Foundation, New York; W. Howard Chase, president, Communications Counselors, Inc., New York; Anna Fillmore, general director, National League for Nursing, Inc., New York; Willard C. Fleming, dean, School of Dentistry, University of California, San Francisco; Don W. Gullett, secretary, Canadian Dental Association, Toronto; Herman E. Hilleboe, Commissioner of

Health, State of New York, Albany; Lawrence A. Kimpton, chancellor, University of Chicago; Charles P. McCormick, chairman of the board, McCormick and Company, Inc., Baltimore; Lee W. Minton, international president, Glass Bottle Blowers Association of the U. S. and Canada, Philadelphia; Franklin D. Murphy, chancellor, University of Kansas, Lawrence; Percy T. Phillips, private dental practitioner, New York; Philip N. Powers, president, Internuclear Company, Clayton, Mo., and Henning W. Prentis, Jr., chairman of the board, Armstrong Cork Company, Lancaster, Pa.

Raymond F. Howes, the Council's acting chief executive, said the Commission will select its own director of the survey. The Commission and its director will be assisted in the four specific areas of work by corresponding committees, the membership of each of which will be composed of individuals having special competence and judgment in that particular area.

The $400,000 cost will be financed by grants as follows: the Kellogg Foundation, $250,000; the American Dental Association, $120,000; Rockefeller Brothers Fund, $25,000 and the Louis W. and Maud Hill Family Foundation, $5,000.

The Commission will hold its first meeting in Washington, D. C. on August 7.

General

UNION'S CHILD DENTAL CARE PLAN REVISED IN CALIFORNIA

Effective July 1, the Welfare Fund Dental Care Program for Children, sponsored by the International Longshoremen's and Warehousemen's Union—Pacific Maritime Association, was revised from an indemnification to a service plan in Northern California.

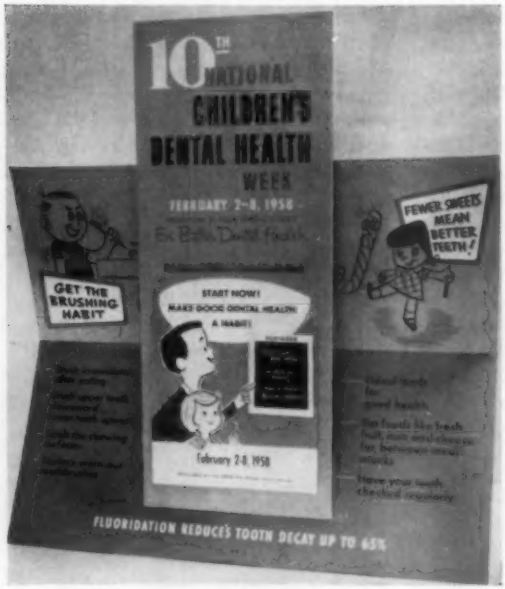
Under the indemnification plan, the dental care rendered to each member's child was limited in amount each year. The parents, however, after proper registration with the union, were allowed to select any reputable licensed dentist. If his fees exceeded those allowed for total care each year, the parents paid the difference themselves. Reimbursement to the dentist up to the maximum amount allowed was made through an insurance company.

With the service plan, a child is to receive all indicated dental care except those services specifically excluded under the program, such as purely cosmetic or esthetic care, orthodontics, and those surgical procedures provided under the Welfare Fund's medical-surgical-hospital coverage. There is no limit to the amount of care provided. However, the dentist selected must be a member of the California Dental Association Service and base his fees on a schedule provided by that nonprofit group. Payment to the dentist will be made through this organization.

DENTAL ASSISTANTS TO MEET NOVEMBER 4-5; FORUM SET

The American Dental Assistants Association will hold its annual meeting November 4-5 in the Ivanhoe Hotel, Miami Beach, Fla., President Mary Francis Dutton, of Macon, Ga., announces.

James Robinson, executive secretary of the Southern California State Dental Association, will speak on office administration at the opening session November 4. Clarence N. Walker, executive staff



One thousand colorful exhibits, prepared for use during National Children's Dental Health Week, February 2-8, 1958, have been made available through a grant from the American Toothbrush Manufacturers Association. Each state dental society has been allotted a number of these exhibits free of charge. The chairmen of National Children's Dental Health Week in each state have complete information. Additional displays may be ordered before September 1 through the Bureau of Dental Health Education of the American Dental Association at a cost of $5 each.

representative, Coca-Cola Co., Atlanta, Ga., will speak on "Keys to Success and Happiness."

A clinic session for dental assistants will be held at 3:30 P.M. in the ballroom of the hotel, with 50 clinicians presenting various phases of assisting procedures.

Several dentists will conduct an educational forum at 9 A.M., November 5, on the following subjects: dental assisting as a public health function, high-speed procedures, and pulp conservation.

Members of the American Dental Association have been invited to attend the sessions of the A.D.A.A.

DENTAL MONOGRAPHS ISSUED BY YEAR BOOK PUBLISHERS

A bimonthly publication "Practical Dental Monographs" is being issued by Year Book Publishers of Chicago. Each issue is a pocket-size, paper bound booklet of under 30 pages, discussing a single topic of current interest in chairside dentistry.

Topics covered to date are the use of elevators, high speed instrumentation and technic for difficult lower impressions. An editorial board under the chairmanship of E. Charaskin of Birmingham, Ala., selects the topics. Leading authorities write the monographs.

LOYOLA ALUMNI LUNCHEON PLANNED FOR NOVEMBER

All alumni of the Chicago College of Dental Surgery of Loyola University who will attend the Association's annual meeting in Miami are being invited to attend a luncheon to be held at noon on Tuesday, November 5, at the Sorrento Hotel.

Ninth State Secretaries' Management Conference discusses problems of state dental societies

The increasingly complex tasks of a state dental society were discussed by executive secretaries and officers of 34 constituent societies June 10-12 in the Central Office, at the Ninth State Secretaries' Management Conference. Major subjects considered included the role of councils or committees and officers in the development of policies in constituent societies, dental laboratory problems, legal hazards for constituent societies, and special problems. Guest participants included representatives of the Canadian Dental Association, American Dental Hygienists' Association, American Dental Assistants Association and the Chicago Dental Society, and Robert J. Wells, Trustee of the Eighth District.

Although dental societies vary in size, administrative staff, funds and geography, there are some committees which should be common to all state societies, Harold Hillenbrand, Association secretary, told the opening session of the conference. Nine essential committees are those on legislation, relief fund, dental health, dental laboratory relations, hospital dental service, insurance, military service, ethics, and annual session, he said. Optional committees are those on constitution and bylaws, membership, necrology, publications, economics, dental education, history, public relations, research, and interprofessional relations.

"Every optional committee or proposed new committee should be studied to determine if its duties can come properly within the purview of an existing council or committee," said Dr. Hillenbrand. "The number of committees should be limited to the number of specific, essential areas of activity in the state society program which can be delineated without conflict or overlapping of duties. . . .

"Committee work in a state society can never be effective unless there is clear designation of authority, responsibility and duties in the bylaws. The development of acceptable bylaws is . . . the prime requisite for the development of a satisfactory committee program."

Three year terms for committee members, development by the state society of a manual for committee members, the holding of conferences of committee officers or members, keeping of attendance records, advance scheduling of committee meetings, advance agendas, a budget, and the responsibility of a committee to make annual reports, were recommended by the speaker.

"Unless a society has an effective system of committees, it will rarely pass the point at which dues collecting, an annual meeting and, perhaps, a publication constitute the sum total of reasons for existence," concluded Dr. Hillenbrand.

Rudolph H. Friedrich, secretary, Council on Dental Health, discussed the role of councils or committees in developing policies in constituent societies.

"The first requirement for the success of a council is the right combination of individuals," asserted Dr. Friedrich. "There are several important criteria which cannot be ignored without inviting failure. The members must favor the basic objectives and policies of the dental society and the council. The members should have a demonstrated interest in some phase of the council's assignment. The members should be familiar with and sympathetic to the group method of problem management. The members should

represent the different opinions which exist in the dental society relative to the assignment of the council. The council should have a chairman who has the ability to stimulate maximum participation of the members, to provoke complete consideration of all possible facets of the problem involved and to lead the council to the most effective solutions and recommendations. . . .

"Councils will be no more effective than the political atmosphere of the dental society will allow them to be. . . . Effective councils can evolve only after a process of good selection, training and administrative supervision. Councils will function best in a framework of sound organizational support and controls fluid enough to be adjusted to major changes in the socioeconomic environment in which the dental profession exists."

D. C. Trexler, director of the department of conferences and institutes, University Extension, University of Mississippi, was one of the guest speakers to address the conference. Mr. Trexler discussed conference and committee technics, drawing on his experience in helping to develop the current dental conference program of the University of Mississippi.

State dental societies interested in organizing conferences should first determine the amount of time available for training and should not tackle too large a problem for the time available, he suggested. The society should determine whether the subject selected best serves the training needs of society members, and whether the subject "fits in" with a long-range training schedule. A three-way partnership of a state society, a school of dentistry and the conference department of a university extension service formed the ideal basis for presenting educational conferences, said Mr. Trexler.

POLICY ROLE OF OFFICERS

The role of the president, secretary, and executive secretary in the development of policies in constituent societies was discussed, respectively, by Henry E. Colby, past president, Minnesota State Dental Association; Harold E. Tingley, secretary, Massachusetts Dental Society, and James Robinson, executive secretary, Southern California State Dental Association.

"The president can be a great factor in the development of policies for a state dental association provided he is able to observe the need for policies and changes in existing policies, that he conduct himself in a manner that commands respect and acceptance as a leader, and that he utilize the political devices and parliamentary tactics available to him in a fair and judicious manner," Dr. Colby said.

The secretary should take no active part in the development of a constituent society policy, as this is the duty of the president, Dr. Tingley said, adding:

"At the time of the pending adoption of a policy the secretary should point out any inconsistencies with and abrogations of the bylaws, standing resolutions and previous votes of his society or those of the Association. In the adoption of a policy the secretary should see that the administrational line is direct and that the right people, committees or councils do the right things in the implementation of the proposed policy. The constituent secretary should see to it that useful established policies are carried out, and redundant ones rescinded. . . . Once a policy has been adopted by the society it should receive the complete and proper treatment by the secretary regardless of his personal views. . . ."

"No executive secretary should introduce a policy unless it deals with administrative work," said Mr. Robinson. "On the other hand, I believe that it is wholly proper to give an opinion, when consulted, providing that it does not involve matters requiring professional training. . . .

"If you have good bylaws, you don't need a long list of policies at the state level," he said. "We all have the advan-

tage of suggested policies by the Association. These are safe policies to follow, and we will have greater need for this help as time goes on, because dental affairs are becoming more complex. . . .

The three preceding papers were discussed by Gory N. Casto, Jr., secretary, West Virginia State Dental Society, and Broderick H. Johnson, executive secretary, Indiana State Dental Association.

DENTAL LABORATORY PROBLEMS

Dental laboratory problems were discussed by these six speakers: Bernard J. Beazley, secretary, Council on Dental Trade and Laboratory Relations; Andrew M. Cunningham, executive secretary, North Carolina Dental Society; Shailer Peterson, secretary, Council on Dental Education; Joseph L. Champagne, secretary, Michigan State Board of Dentistry; Paul W. Clopper, secretary, Illinois State Dental Society, and Robert E. Paulsen, executive secretary, Washington State Dental Association.

The need for amending the *Trade Practice Rules for the Commercial Dental Laboratory Industry* was under study by the Federal Trade Commission and a decision was expected shortly, said Mr. Beazley.

"Some members of the dental profession have received the erroneous impression that the *Rules* have a legislative effect and, therefore, the promulgation of the *Rules* has altered the historic adjunctive relation of the dental laboratory to the dentist," said Mr. Beazley. "I hope that this inaccurate concept of the nature of trade practice rules will be abandoned as quickly as it deserves to be. . . . The hearing examiner for the Federal Trade Commission read into the record [of the February 4 public hearing] a prepared statement in which he indicated that it was the 'earnest hope' of the Commission 'to eliminate entirely the existent misapprehension that these *Rules* are in any sense legislation.'"

The speaker discussed the sequence of events wherein enforcement of the Federal Denture Act in Illinois was followed by subpoenas to the Association, the Illinois State Dental Society, the Indiana State Dental Association, several local dental societies, the Illinois Dental Laboratory Association and individual dentists, dental laboratory owners and technicians to appear before a federal grand jury in Chicago. Relations between the Association and the National Association of Dental Laboratories had been strengthened during the past year, said Mr. Beazley.

Mr. Cunningham reported on the state program of accreditation of commercial dental laboratories in North Carolina and the problems encountered in its administration. In the past year the plan had been practically inoperative, he said. Of about 65 laboratories in the state, 26 are members of the laboratory association.

"Fortunately the laboratory trade and the dental profession in North Carolina are generally in agreement on the value of accreditation," he said. "Unfortunately, neither group has been in total agreement, even among themselves, as to how it should be administered."

The proposed certification program for dental laboratory technicians was discussed by Dr. Peterson.

"The purpose of these educational requirements," he said, "is to provide an outline of an educational program which it is believed will be effective in providing the training and experience needed by a dental laboratory technician. The character and the quantity of the training and experience have been planned with full realization that the dental laboratory technician is adjunctive to the dental profession, that the function and responsibilities of the dental laboratory technician are defined through the statutes of the individual states and that the educational program must be essentially vocational in character."

The new set of educational require-

ments recommended by the Council on Dental Education provides for training five types of dental laboratory technicians —those with general knowledge, and those technicians to be equipped to process complete dentures, partial dentures, to work in ceramics, and in crown and bridgework, said Dr. Peterson. The plan contemplates that all students will spend the first academic year of about nine months in an educational institution such as a vocational school, junior college or in those dental schools which wish to provide this type of training, with the second part of the course to be conducted in most instances in dental laboratories, in an on-the-job training program. Competence for certification will be demonstrated by performance of a comprehensive battery of examinations.

"The 'Requirements for the Approval of Educational Programs for Dental Laboratory Technicians' which have been approved by the Council on Dental Education, and which will need to be approved by the House of Delegates before they become official, will provide the dental profession with the vehicle by which organized dentistry will continue to supervise these educational programs," he said. "As a result, the Council on Dental Education would be responsible for examining and accrediting these programs whether they be conducted in an educational institution or in a dental laboratory. The actual conduct of the certification program would be the responsibility of another agency, presumably an agency or board sponsored by the National Association of Dental Laboratories."

Mr. Champagne told the conference that the Michigan State Board of Dentistry was "unalterably opposed to the licensing of technicians."

"The dental technician is prohibited by law to render services directly to the public," he said. "He can only perform technical services on prescriptions issued by a duly licensed dentist. In Michigan, we believe that the problem can best be solved by amending the dental law . . ., requiring all laboratories to register with the State Board of Dentistry with the right of entry by the board and that the profession be required to furnish prescriptions for all laboratory services. . . . Nothing would be more conducive to law enforcement than regulation of the laboratories and help to the worthy ones."

House Bill 1118, a "public denturist" bill recently introduced into the Illinois legislature, was discussed by Mr. Clopper. "With the spread of public denturist bills and attempted legislation to stop fluoridation of communal water supplies, it behooves every state organization to be on the alert for this type of legislation and to do everything in its power to control such legislation at the outset," he said.

Mr. Paulsen described the fight against public denturist legislation in the State of Washington.

"We are certain that we must continue with our projects to educate both the general public and our legislators as to dental needs and care; we must continuously improve our relations with both groups; and our legislative problems must be approached as only one portion of our over-all program . . . and not something to be worked with and studied only during the time our legislature is in session," said Mr. Paulsen. "We are conscious of the interrelation of those seeking to either destroy or place undesirable additions to the dental laws of Washington with similar groups in other states, and so we are watching national activity closely."

LEGAL HAZARDS

At the afternoon session John G. Rooks, executive secretary, California State Dental Association, led a discussion on legal hazards for constituent societies. Among the subjects discussed were the following: not-for-profit corporations, ownership of income producing property, libel and

slander, restraint of trade, responsibility of agents, lobbying, indemnification of officers, dental service corporations, and dental fees.

SPECIAL PROBLEMS

The closing session June 12 was devoted to special problems of constituent societies.

Bernard J. Conway, secretary of the Judicial Council, discussed ethical problems relating to specialization and limitation of practice.

"The local society is the most important agency within organized dentistry in the application and enforcement of the governing rules of ethics," he said. "With few exceptions it is the component society that must initiate any type of disciplinary action against a member of the Association. It is the local society which determines what is customary for dentists within its community; community custom is the criterion of ethical conduct in at least five sections of the *Principles of Ethics*. Within Section 18, for example, the local dental society has complete discretion to prescribe the standards for announcing a limitation of practice. The local society, however, has limited discretion in determining the propriety of specialty announcements. Section 18 clearly provides that specialty announcements must be limited to specialties approved by the American Dental Association and that a dentist may announce himself in only one of the approved specialties. The local society does have discretion in determining what members of the society will be permitted to announce themselves as specialists."

Ethical problems relating to publicity were discussed by Herbert B. Bain, director of the Association's Bureau of Public Information.

"Unlike the situation of only a few years ago, today almost all dental societies use publicity in one form or another in support of their objectives of encouraging the improvement of the health of the public and promoting the art and science of dentistry," he said. "The old concept that the name of the ethical practitioner must not appear in print has long since been discarded in favor of a realistic approach to news reporting. Today, it is generally accepted that officials of professional societies may properly issue statements for quotation in the press and on the radio and television. The names of essayists, clinicians and others may properly be used in conjunction with publicity based on their articles printed in professional journals or their presentations at scientific meetings. As a rule, the names of professional men should be used only as the source of the news and should be of secondary importance to the news itself. . . . Publicity should be evaluated in relation to the basic objectives of the society. Publicity which serves this purpose is useful and desirable."

B. Duane Moen, director, Bureau of Economic Research and Statistics, discussed methods to be used in conducting statistical studies. The need for detailed statistical information concerning dentistry was increasing, said the speaker.

"One reason is the ever-increasing interest of members of Congress in the health needs of the people. . . . There is no substitute for factual data in analyzing the supply and demand for dental services for purposes of informing members of Congress. Another reason why statistics on dentistry have been growing in importance is the development of group programs for dental health care. An organized group desiring to establish a dental program for its members needs to know the cost of the program it proposes."

Since 1950 his Bureau had assisted more than 40 state dental societies and several district societies in conducting dental fee surveys, said Mr. Moen.

Ray Cobaugh, executive secretary of the Pennsylvania State Dental Society,

Conferees from 34 constituent societies and guests from several auxiliary groups attended the Ninth State Secretaries' Conference June 10-12 in the Central Office. Business sessions were held in the board room. Standing at the rostrum (l. to r.): Louis M. Cruttenden, assistant secretary of the Association; Patricia A. Martin, of the Bureau of Library and Indexing Service; Marion Philips, assistant secretary's office; Harold Hillenbrand, Association secretary; Rudolph H. Friedrich, secretary, Council on Dental Health; Herbert B. Bain, director, Bureau of Public Information; Bernard J. Beazley, secretary, Council on Dental Trade and Laboratory Relations; Joseph L. Champagne, secretary, Michigan State Board of Dentistry, and Shailer Peterson, secretary, Council on Dental Education.

discussed the successful effort to rescind a Pennsylvania tax on dentures and materials used by dentists. He urged other state societies to oppose resolutely the imposition of any tax on dental materials and appliances "because, if the tax is once imposed, it is extremely difficult to have it removed."

VALUE OF AN AUDIT

John E. Rush, assistant business manager of the Association, discussed the value of an informative audit to dental societies.

"The dental society audit should be so prepared that it will convey to the officers, trustees and membership a complete picture of the operation of the society concerning the acquisition, disposition and investment of funds of the society during a specific period," he said. "To serve this purpose, the audit must observe three fundamentals. It must be accurate. It must be complete. These two factors are so important that the third item is sometimes overlooked. This third fundamental is that the audit must fulfill its primary objective, that is, inform the reader. By

its very nature, the good audit will indicate areas in which action is needed by those who have final responsibility for the fiscal affairs of the society."

Dentistry was urged to support science fairs for elementary and high school students. Sholom Pearlman, assistant secretary of the Association's Council on Dental Therapeutics, said participation by dentists in science fairs could achieve both immediate and long-term benefits.

"By actively supporting science fairs from the local to the national level, dentists can demonstrate that the profession is vitally interested in the progressive scientific aspects of health improvement as well as in the purely technical manipulations with which dentistry has become associated in the public mind. Dentists can identify themselves more clearly as a scientific profession, whose basis is rooted in fundamental science.

"By supporting science fairs and offering encouragement and scientific advice to individual students, dentists can develop better and more sympathetic relationships with their communities, with local schools and with individuals. . . .

"The science fair program is here to stay. The sooner dentistry supports it, the sooner will we see results. There is much to be gained by participation and nothing to be lost. Most important, with competition for scientific minds becoming more acute from day to day, we have an obligation to step up our efforts to entice the more imaginative and progressive individuals toward a calling so important as ours is to the health of the nation."

The conference closed with an open forum discussion at which Dr. Hillenbrand presided.

It was announced by Louis M. Cruttenden, assistant secretary of the American Dental Association, that the next state secretaries' conference will be held June 9-11, 1958.

COUNCIL ON DENTAL TRADE AND LABORATORY RELATIONS

Amendment of Trade Practice Rules for Commercial Dental Laboratory Industry

On June 14, 1957, the Federal Trade Commission announced that it had amended the "Trade Practice Rules for the Commercial Dental Laboratory Industry." The Commission's action results from a request made by the Council on Dental Trade and Laboratory Relations in mid-1956 that the *Rules* be amended or revoked. During the October, 1956, meeting of the Association's House of Delegates, the Commission announced that it would hold a public hearing for the purpose of receiving information on the need to amend the *Rules;* at the same time the Commission announced that it would not revoke the *Rules.* On February 4, 1957, the Commission held a public hearing in Chicago at which arguments were made for and against the amendment of the *Rules.* A digest of the presentations made by Association representatives at the February 4 hearing was presented in the May issue of THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

The text of the Commission's announcement regarding the amendment of the *Rules* follows.

Trade practice rules for the Commercial Dental Laboratory Industry, consisting of thirteen Group I Rules preceded by a statement by the Commission, were promulgated by the Federal Trade Commission under its trade practice conference procedure on November 4, 1955.

Thereafter, pursuant to petitions filed by proper parties under section 2.31 of the Commission's rules of practice, the Commission directed that a limited public hearing be held on February 4, 1957, for the purpose of considering amendment of the definition of the industry set forth in the second paragraph of the statement by the Commission; of Rule 1 entitled "Deception (General)"; of Rule 2 entitled "Deceptive Demonstrations and Claims"; of Rule 12, entitled "Prohibited Discrimination"; and for considering elimination of Rule 13, entitled "Exclusive Deals."

After full consideration of all views and information submitted relative to the proposed amendments and deletions, the Commission directed that the word "design" be deleted from the definition of the industry and specifically found and states that the purpose of the definition of the industry preceding trade practice rules is solely to identify individuals and concerns whose practices are subject to the rules, and that it is not necessary to include the word "design" in the definition of the industry for that purpose. The Commission directed that the words "design" and "occlusion" be eliminated from Rule 1 and the term "design" from Rule 2, for the reason that in the Commission's opinion these words are not necessary to the adequacy of the rules or to the accomplishment of the Commission's purpose in the promulgation of them. The Commission states that the above action does not constitute a decision by it as to the specific functions in these two respects, which are performed by industry members covered by the rules. The Commission further directs that Sections III and IV of Rule 12 be deleted for the reason that there has been shown no need for the inclusion of these sections; and that the request for deletion of Rule 13 be denied for the reason that the same is in proper form and supplies needed rule coverage.

Set forth below is amended paragraph 2

of the statement by the Commission and amended Rules 1, 2 and 12 which are hereby approved and ordered promulgated. Amended Rules 1, 2, and 12 become operative thirty (30) days from the date of their promulgation and supersede rules bearing the same numbers and titles contained in the trade practice rules which were promulgated for the industry on November 4, 1955. All other rules promulgated for the industry on said date remain in effect.

AMENDED PARAGRAPH 2
OF STATEMENT BY THE COMMISSION

The industry for which these rules are established is composed of persons, firms, corporations, and organizations engaged in the manufacture, processing or repair of orthodontic corrective appliances, prosthetic dental appliances, ceramic or plaster teeth encapments, cast-metal dental appliances, dental inlays, dental bridges, and other types of oral restorations.

AMENDED RULE 1—
DECEPTION (GENERAL)

It is an unfair trade practice to sell, offer for sale, or distribute any industry product, or promote the sale or distribution thereof, under any representation or by any method or under any circumstance or condition which has the capacity and tendency or effect of misleading or deceiving purchasers or prospective purchasers—

(a) with respect to a process or technique used in the preparation or fabrication of any industry product; or
(b) with respect to the materials used in the fabrication of any industry product; or
(c) which is false, misleading, or deceptive in any other material respect.

(Note: Nothing in this Rule 1, nor in any of the other rules for this industry, is to be construed as relieving any industry member of the necessity of complying with the requirements of the Federal Food, Drug and Cosmetic Act, and regulations issued thereunder.)

AMENDED RULE 2—
DECEPTIVE DEMONSTRATIONS
AND CLAIMS

(a) In the sale, offering for sale, or distribution of industry products, or in the promotion and distribution thereof, it is an unfair trade practice to demonstrate any of such products in a manner or under circumstances, having the capacity and tendency or effect of creating a false impression in the minds of purchasers or prospective purchasers as to the actual benefits they will obtain as the result of their purchase and use of said products.
(b) It is an unfair trade practice for a member of the industry to represent, claim, or guarantee that his laboratory has the skill, ability, equipment, or personnel to construct, fabricate or process a product of the industry under a specific technique or method, unless such representation, claim, or guarantee is made with the knowledge that complete and satisfactory accomplishment can be furnished with the facilities and personnel of such member laboratory.
(c) It is an unfair trade practice for any member of the industry to represent, claim, or guarantee that any technique or method of manufacture used is the equivalent of, or substitute for, any other method or technique, unless such is the fact.

AMENDED RULE 12—
PROHIBITED DISCRIMINATION[1]

Section I. *Prohibited Discriminatory Prices, Rebates, Refunds, Discounts, Credits, Etc., Which Effect Unlawful Price Discrimination.* It is an unfair trade practice for any member of the industry engaged in commerce, in the course of such commerce, to grant or allow, secretly or openly, directly or indirectly, any rebate, refund, discount, credit or other form of price differential, where such rebate, refund, discount, credit, or other form of price differential, effects a discrimination in price between different purchasers of goods of like grade and quality, where either or any of the purchases involved therein are in commerce, and where the effect thereof may be substantially to lessen competition or tend to create a monopoly in any line of commerce or to

1. As used in Rule 12, the word "commerce" means "trade or commerce among the several States and with foreign nations, or between the District of Columbia or any Territory of the United States and any State, Territory, or foreign nation, or between any insular possessions or other places under the jurisdiction of the United States, or between any such possession or place and any State or Territory of the United States or the District of Columbia or any foreign nation, or within the District of Columbia or any Territory or any insular possession or other place under the jurisdiction of the United States."

injure, destroy or prevent competition with any person who either grants or knowingly receives the benefit of such discrimination, or with customers of either of them: *Provided, however*—

(a) That the goods involved in any such transaction are sold for use, consumption, or resale within any place under the jurisdiction of the United States, and are not purchased by schools, colleges, universities, public libraries, churches, hospitals, and charitable institutions not operated for profit, as supplies for their own use;

(b) That nothing contained in Section I of this Rule 12 shall prevent differentials which make only due allowance for differences in the cost of manufacture, sale or delivery resulting from the differing methods or quantities in which such commodities are to such purchasers sold or delivered;

(Note: Cost justification under the above proviso depends upon net savings in cost based on all facts relevant to the transactions under the terms of proviso (b). For example, if a seller regularly grants a discount based upon the purchase of a specified quantity by a single order for a single delivery, and this discount is justified by cost differences, it does not follow that the same discount can be cost justified if granted to a purchaser of the same quantity by multiple orders or for multiple deliveries.)

(c) That nothing contained in this Rule 12 shall prevent persons engaged in selling goods, wares, or merchandise in commerce from selecting their own customers in bona fide transactions and not in restraint of trade;

(d) That nothing contained in Section I of this Rule 12 shall prevent price changes from time to time where made in response to changing conditions affecting the market for or the marketability of the goods concerned, such as but not limited to obsolescence of seasonal goods, imminent deterioration of perishable goods, distress sales under court process, or sales in good faith in discontinuance of business in the goods concerned;

(e) That nothing contained in this Rule 12 shall prevent the meeting in good faith of an equally low price of a competitor.

Section II. *Prohibited Brokerage and Commissions.* It is an unfair trade practice for any member of the industry engaged in commerce, in the course of such commerce, to pay or grant, or to receive or accept, anything of value as a commission, brokerage, or other compensation, or any allowance or discount in lieu thereof, except for services rendered in connection with the sale or purchase of goods, wares, or merchandise, either to the other party to such transaction or to an agent, representative, or other intermediary therein where such intermediary is acting in fact for or in behalf, or is subject to the direct or indirect control, of any party to such transaction other than the person by whom such compensation is so granted or paid.

Section III. *Inducing or Receiving an Illegal Discrimination in Price.* It is an unfair trade practice for any member of the industry engaged in commerce, in the course of such commerce, knowingly to induce or receive a discrimination in price which is prohibited by the foregoing provisions of this Rule 12.

Section VI. *Purchases by U. S. Government —Applicability of Robinson-Patman Antidiscrimination Act to Same.* In an opinion submitted to the Secretary of War under date of December 28, 1936, the U. S. Attorney General advised that the Robinson-Patman Antidiscrimination Act "is not applicable to Government contracts for supplies." (38 Opinions, Attorney General 539.)

Promulgated by the Federal Trade Commission—June 14, 1957

Robert M. Parrish,
Secretary

BUREAU OF LIBRARY AND INDEXING SERVICE

Nomenclature

The American Dental Association has had a committee on nomenclature or has carried out projects of some kind on nomenclature since 1877. The report of G. V. Black on the terminology of cavity preparation and dental anatomy in 1893 was the first notable product of these efforts. This was followed in 1937 by a glossary which appeared in the *American Dental Association Transactions* for 1937. The nomenclature committee in 1948 reported that work with terminology could not be carried on satisfactorily under the arrangement then in force. It was decided, therefore, during the 1948 revision of the Association by-laws, to transfer work on nomenclature to the Bureau of Library and Indexing Service through the directive "to develop uniform standards of nomenclature in the field of dental science."

Fortunately, Dr. George B. Denton, after 33 years of teaching experience in dental literature and dental history was added to the Bureau staff in 1949 to undertake the development of the nomenclature project. Three workshop conferences on nomenclature were held, in 1952, 1953 and 1954. In addition consultative service on nomenclature problems has been offered.

During this time material has been gathered and a general work on terminology with particular reference to dental science has been prepared which will soon appear in book form. This book *The Vocabulary of Dentistry and Oral Science* is not a dictionary. It is educational rather than dictatorial in intent. This approach is in keeping with the Association's practice of including all interested individuals and the various specialty groups in all its activities pertaining to nomenclature. The book is unique in the field of professional terminology.

Following are a few excerpts from *The Vocabulary of Dentistry and Oral Science:*

Scientific language, like all language, is not altogether stable. Words are created, modified, and discarded. The language of science develops and diverges with events. It varies somewhat with geographic locations. Its usages differ somewhat with different groups of persons, schools of thought, and even individuals.

A technical term comes into being in response to the need to identify and express a concept. The term continues to exist as long as the need for the concept persists and as long as the users of the concept have found no better term to designate it. The term is discarded if the concept has ceased to be required or if, in the opinion of the users, a more satisfactory term has been found.

The form in which the term originates and any changes that may be brought about in the term are the result of opinions, of many sorts, as to the requisites of a desirable term. Some of these influences that are brought to bear on scientific language are natural and inevitable; others, sometimes equally effective, are extraneous, trivial, or irrelevant.

SCIENTIFIC ADVANCES

Most fundamental among the influences on scientific terminology are the growth of scientific knowledge and the introduction of new technics, materials, and in-

struments. These natural developments, of necessity, call for extended meaning of old terms and the creation of new words. Some of these developments will lie outside dental science and dental practice, but may be expected to influence viewpoints and attitudes toward existing dentistry, and therefore to be reflected by modified dental terminology.

Science that underwent great development during the nineteenth century might naturally be expected to influence dentistry during the same period. Chemistry, physics, bacteriology, general histology, and genetics are among such contributors to oral terminology. Terms like *reciprocal anchorage, stress breaker, resistance form,* and *vertical overloading* surely betray the influence of mechanics. The change from *tooth bone* to *dentin,* and the addition of *cementum* to the dental vocabulary are the result of comparative anatomy and microscopy. *Prognathism* and *diastema,* originally employed by anthropology, where they represented natural racial and species characters respectively, have been taken over by orthodontists to represent similar, but anomalous, conditions.

Advances in dental science and dental technology based largely on advances in science outside dentistry have had direct impact on the professional terminology. Where discoveries in physics or chemistry have been adapted and applied to new dental uses, new terms have appeared such as *radiodontics, bitewing film, direct filling resin, carbide bur, supersonic engine,* and so on. A development in one science or technic may have a suppressive or restrictive effect on the terminology of another. An instance of the negative influence of another science on dental terminology is the use of the term *radiogram* for a message conveyed by radio, thus precluding the logical use of *radiogram* for a picture produced by radiography.

POPULAR ADAPTATION

A reactionary tendency against the use of technical language is frequently present in the usage of professional authors. It is assumed that no difference is necessary and none should exist between terms used for communication to and among nonprofessional persons and for discourse among members of a technical profession. As a result of this assumption the terms found useful by the practitioner in addressing the patient are carried over into his intercourse with his professional colleagues.

This sort of adaptation of the symbols for scientific concepts is accomplished either by simplification or by popularization. Simplifying the designations of concepts is usually done by substituting for technical terms, approximate terms from the common or standard vocabulary. Examples of this method are the use of *primary teeth* or *foundation teeth* for the technical term *deciduous teeth,* the use of *plate* for *denture, braces* for *appliance, straightening teeth* for *alignment of teeth, nerve* for *pulp,* and so on.

Popularization consists in the use of devices to arrest attention, give vividness or picturesqueness, or to endow the concept with sentimental or other appeal. Reference to the contour of the lips as the *cupid's bow* exemplifies the latter device. The designations of malposed teeth as *crooked teeth* or *buck teeth* are also in the nature of popularized substitutions. Some of the older picturesque terms, such as *mush bite, dry socket* and *jumping the bite,* originated before their more objective present day equivalents.

The effect of this sort of adaptation is to convey an approximation of the technical term, with some extraneous connotation which may result in more or less misinterpretation. The results of popular adaptation are much like those motivated by publicity and euphemism.

The American Dental Association Film Library

In response to many inquiries from dentists for a film that shows the day to day duties of a dental assistant, the following three films are noted since there is no one film alone that fulfills this need. The first one, "DT 12, Dental Assistants—Their Effective Utilization," page 14 of the booklet, *Audio-Visual Materials in Dentistry,* is the most suitable since it was produced for the purpose of demonstrating a dental assistant's duties. The other films have sequences in which the dental assistant is seen performing other duties in a dental office. Both of these films, therefore, can be used to supplement the first or the three may be used in a series of programs on dental assisting. The second film, "DT 100, Beauty with Oral Health," page 7 of the new supplement to the booklet, *Audio-Visual Materials in Dentistry,* shows a dental assistant helping the dental practitioner by preparing alginate and hydrocolloid compounds for taking impressions. The third film, "DH 27, An Introduction to Someone You Know," page 13 of the supplement, shows how a dental assistant functions in an emergency situation.

These films, as well as the two reviewed in this article, are available for rental ($2.50) from the Film Library.

FILM REVIEW

Immediate Denture Surgery • 16 mm., color, sound, 16 minutes. Produced in 1955 by the State University of Iowa College of Dentistry, Iowa City. Photography by the Bureau of Audio-Visual Instruction, State University of Iowa. Can be purchased ($130) from the producer.

The film opens with intraoral views of the patient while the narrator explains the anatomy of the mouth. The color density of the soft tissue and the tuberosity regions are noted. A profile view reveals the facial contour. A favorable ridge relationship between the maxilla and the mandible is indicated. The importance of roentgenograms is stressed. The size of the maxillary sinus is mentioned.

Impressions are taken and models are made and mounted on articulators. The models are carefully trimmed to approximate the appearance of the alveolar ridge after the anterior teeth have been extracted. A clear acrylic surgical splint is made to serve as a guide in trimming and shaping the alveolar ridge. The denture-bearing areas serve as guides for the splint. The demonstration on the model is followed by the operation on the patient. Six anterior teeth are extracted. The surgical splint is placed over the ridge while the procedure for contouring the ridge is explained.

The dentures are inserted immediately after the surgical procedure is completed. The periphery and occlusion are checked. The patient is seen 24 hours postoperatively. The sutures are removed on the fourth postoperative day. A full view is shown on the patient three months postoperatively.

This film is well presented for teaching. The photography is clear. Although the technics used may differ from those taught in other dental schools there are no scientific inaccuracies. It is suitable for dental students, general practitioners, prosthodontists, and oral surgeons.

FILM REVIEW

Method of Mouth Reconstruction • 16 mm., color, silent, 45 minutes. Produced in 1955 by Harmon Shohet, D.M.D., 20 Gloucester St., Boston, Mass. Photography by Dr. Shohet. No copies are available for purchase.

The film shows in detail the chair and laboratory work involved in reconstructing a mouth through bite raising. The film opens showing front and profile views of the patient. With teeth in occlusion, facial expressions are observed for indications of closed bite. After the facial muscles are fatigued the patient is requested to swallow and rest mandible or to say "Emma" so that the operator may obtain and measure the "physiological rest" position. A diagram shows the physical rest position and the physiological position with 6 mm. freeway space. This is compared with the 3 mm., normal freeway space. Upper and lower impressions are then taken. The closed bite is opened tentatively about 3 mm. The biterim to be used in determining the desired vertical height is constructed and adjusted to contact

upper teeth at the new vertical height. The freeway space is now 3 mm. A gothic arch disk, with adjustable stylus, is attached to upper bite plate, parallel to and slightly below the occlusal plane. Another disk is attached to lower biterim, parallel and 3 mm. below occlusal plane. A celluloid disk with opening approximating the size of the stylus point, is prepared. The lower disk is painted and 2 mm. wax are trimmed from both sides to allow free movement of the mandible.

The upper study model is removed and re-articulated to new vertical height and correct centric relationship. All upper teeth except one anterior, one right and one left posterior, are prepared. Unprepared teeth are to be used as "stops" and "guides." After all lower teeth, except one anterior and one posterior on each side are prepared, all temporary crowns are removed and the mandibular side of transfer guide is completed. Lower dies and counter dies are made.

Upper and lower working models are articulated to obtain the desired vertical and correct centric relationships. With all counter dies seated, alternate counter dies are removed. Those remaining are used as guides for length and contour in waxing the exposed dies.

A 20 degree template determines the occlusal plane. With the upper wax forms in position, the lower forms are fashioned. The anatomic forms and occlusal planes of both arches are coordinated carefully before casting. Correct anatomic forms, proper alignment with roots, shallow cusps and reduced buccolingual dimensions are emphasized. The film concludes by showing the completion of the rehabilitation.

This is a good teaching film. Although it is silent, the explanatory legends make the steps demonstrated intelligible to the viewer. It is suitable for general practitioners and prosthodontists. Dental societies and study clubs will find the film provocative of discussion.

Additions to the Library

The books listed here have been added recently to the Library collection. Requests for this material, available on loan to all members of the Association, should be addressed to the Bureau of Library and Indexing Service. There is no charge for borrowing these books. Most of these books may be purchased through the Bureau. Practically all the dental journals published in the world are available also to members.

BOOKS

American Cyanamid Company. Lederle Laboratories Division. Atlas of normal anatomy. Pearl River, N. Y., 1956. 48 colored plates.

American Dental Association. Geographical areas of the component societies of the American Dental Association. Chicago, 1957. 80 p. Mimeo.

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American Dental Association. Council on Dental Education & U. S. Public Health Service. Division of Dental Resources. How students finance their dental education; a report prepared by Walter J. Pelton, Quentin M. Smith, Elliott H. Pennell, Ruth Dee Bothwell, James N. Ake. Chicago, 1956. 85 p.

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Bonner, T. N. Medicine in Chicago 1850-1950; a chapter in the social and scientific development of a city. Madison, Wis., American History Research Center, 1957. 302 p. $5.

Bregstein, S. J. Interviewing, counseling, and managing dental patients. Englewood Cliffs, N. J., Prentice-Hall, 1957. 310 p. $7.50.

Canadian Dental Association. Health Insurance Committee. Agenda, March 25-26, 1957. Toronto, 1957. 32 p.

Committee to Protect Our Children's Teeth, Inc. Our children's teeth; a digest of expert opinion based on studies of the use of fluorides in public water supplies. New York, 1957. 104 p. $1.

CROSS, M. E. Orally speaking; a brief history of dentistry and the part the M. F. Patterson Dental Supply Co. has played in it throughout the greater part of the West during the past eighty years. St. Paul, Minn., published for the M. F. Patterson Dental Supply Co. by the Webb Publishing Co., 1957. 179 p.

DAVIDSON, H. A. Guide to medical writing; a practical manual for physicians, dentists, nurses, pharmacists. New York, Ronald Press, 1957. 338 p. $5.

FINN, S. B.; CHERASKIN, EMANUEL; VOLKER, J. F. & OTHERS. Clinical pedodontics. Philadelphia, Saunders, 1957. 664 p. $12.

FRIEDENTHAL, MARCELO. Psicología para el profesional del arte de curar. 2d ed. Buenos Aires, 1956. 131 p.

FRYKHOLM, K. O. On mercury from dental amalgam; its toxic and allergic effects and some comments on occupational hygiene. (Acta Odontologica Scandinavica, Vol. 14, Sup. 22.) Stockholm, 1957. 108 p.

GEBHARDT, HANS. Leitfaden der Jugendzahnpflege; für Jugendzahnärzte, Jugendärzte, Kreisärzte, Studenten der Zahnheilkunde. Berlin, Volk und Gesundheit, 1956. 55 p. DM4.

GREAT BRITAIN. MEDICAL RESEARCH COUNCIL. The hazards to man of nuclear and allied radiations. London, H. M. Stationery Off., 1956. 128 p. $1.04.

GUTWIRTH, S. W. You can stop worrying; a practical method for quieting the mind. Chicago, Regnery, 1957. 114 p. $3.

INTERNATIONAL ASSOCIATION FOR DENTAL RESEARCH. Preprinted abstracts; thirty-fifth general meeting, March 21, 22, 23, 24, 1957, The Claridge Hotel, Atlantic City, N. J. 118 p.

INTERNATIONAL ASSOCIATION FOR DENTAL RESEARCH. Preprinted abstracts; thirty-fourth general meeting, March 22, 23, 24, 25, 1956, Hotel Jefferson, St. Louis, Mo. 93 p.

JACKSON, H. M. The story of the Royal Canadian Dental Corps. Montreal, 1956. 475 p. $5.

LEPP, F. H. Neoplasias del sistema reticuloendotelial de la cavidad bucal. (Reprinted from "Ciencia y Cultura" de la Universidad Nacional del Zulia.) Maracaibo, 1956, 65 p.

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MONHEIM, L. M. Local anesthesia and pain control in dental practice. St. Louis, Mosby, 1957. 299 p. $8.75.

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NATIONAL BUREAU OF STANDARDS. DENTAL RESEARCH SECTION. Dental research; collected reprints 1951-55. Washington, 1951-55.

ROCHESTER. UNIVERSITY. SCHOOL OF MEDICINE AND DENTISTRY. Collected reprints; publications of the Division of Dental Research 1949 to 1956. Rochester, N. Y., 1956. 61 reprints.

RODIN, ARNOLD. Beware . . . the dental racketeers; the inside story of a bootleg business that costs unwary patients $200,000,000 a year. (Reprinted from American Weekly 1955.) Chicago National Research Bureau, 1956. 7 p.

SARNAT, B. G. & SCHOUR, ISAAC. Essentials of oral and facial cancer. 2d ed. Chicago, Year Book Publishers, 1957. 297 p. $8.50.

SCHUBERT, J. & LAPP, R. E. Radiation; what it is and how it affects you. New York, Viking Press, 1957. 314 p. $3.95.

STEFANSSON, VILHJALMUR. The fat of the land; with comment by Frederick J. State and Paul Dudley White. ("And visit your dentist twice a year" p. 90-111.) New York, Macmillan, 1956. 339 p. $5.

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COUNCIL ON DENTAL THERAPEUTICS

Council announces classification of additional products

The classification of products by the Council on Dental Therapeutics has been described in a previous report (J.A.D.A. 40:489 April 1950). The Council's program now provides for classification of products in Group A, Group B, Group C and Group D. Products are reconsidered periodically, and decisions are subject to change at any time that a substantial amount of new evidence becomes available. The files of the Council contain information on many drugs and dental cosmetics, and inquiries are welcome.

GROUP A

Listing of products in Group A means that at the time of their consideration, the items conformed with the provisions for acceptance established by the Council on Dental Therapeutics and adopted by the Board of Trustees and the House of Delegates of the American Dental Association. Items in this group will be listed in *Accepted Dental Remedies*, and may use the Seal of Acceptance, unless otherwise provided.

The following additional products are classified in Group A:

Secobarbital Sodium, U.S.P.
(See A.D.R. 1957, p. 6)

Seconal Sodium (Eli Lilly and Company): A brand of secobarbital sodium, U.S.P.

Seconal Sodium Capsules (Pulvules), 0.0325 Gm., 0.05 Gm., 0.1 Gm.: Stated to contain secobarbital sodium and excipient.

Seconal Sodium Ampuls, 0.25 Gm.: Each ampul is stated to contain secobarbital sodium, 0.25 Gm. Addition of 5 ml. of water for injection provides a 5 per cent (50 mg. per ml.) solution.

Seconal Sodium Solution, 50 mg. per cc.: Each 100 ml. is stated to contain secobarbital sodium, 5 Gm.; polyethylene glycol (200), 51 ml.; phenol (as a preservative), 0.25 Gm.; water for injection. In multiple dose containers of 20 cc. size.

Methadone Hydrochloride
(See report on p. 297)

Dolophine Hydrochloride (Eli Lilly and Co.): A brand of methadone hydrochloride.

Dolophine Hydrochloride Tablets, 2.5 mg., 5 mg., 7.5 mg. and 10 mg.: Stated to contain methadone hydrochloride and excipients.

Dolophine Hydrochloride Syrup, 10 mg. per 30 cc.: Each 100 Gm. of syrup is stated to contain methadone hydrochloride, 0.025 Gm.; citric acid, 0.65 Gm.; sucrose, 57.6 Gm.; alcohol, 3.3 Gm.; benzoic acid, 0.153 Gm.; FD&C color, flavor and distilled water.

Dolophine Hydrochloride Injection 10 mg. per cc.: Each 100 Gm. is stated to contain methadone hydrochloride, 0.95 Gm.; sodium chloride, 0.85 Gm.; chlorobutanol, 0.47 Gm.; water for injection. Marketed in 1 cc. ampuls and in 20 cc. multiple dose containers.

Ascorbic Acid, U.S.P.
(See A.D.R. 1957, p. 165)

Cevalin (Eli Lilly and Co.): A brand of ascorbic acid.

Cevalin Tablets, 25 mg., 50 mg., 100 mg.: Stated to contain ascorbic acid and excipients.

Riboflavin, U.S.P.
(See A.D.R. 1957, p. 164)

Tablets Riboflavin 5 mg., 10 mg. (Eli Lilly and Co.): Stated to contain riboflavin and excipients.

GROUP B

Listing of products in Group B means that there is insufficient evidence to justify their present acceptance, but there is reasonable evidence of their usefulness and safety. These products meet the other qualifications and standards established by the Council on Dental Therapeutics. It is the Council's opinion that Group B products may be promoted for special use and study.

The Council's initial consideration of products which may be eligible for Group B listing is influenced favorably by the knowledge of further investigations then in progress. It is the policy of the Council to reconsider Group B products each year on the basis of new evidence which may be produced in their support. Classification in this category is not ordinarily continued for more than three years.

GROUP C

Listing of products in Group C means that the evidence is so limited or inconclusive that the products cannot be accurately evaluated. It is the Council's opinion that Group C products require further study by qualified investigators.

The following additional class of products is classified in Group C:

Brands of novobiocin (See report on p. 298)

GROUP D

Listing of products in Group D means that they are unacceptable because of their demonstrated inability to meet the standards outlined in the provisions for acceptance.

Council discusses use of methadone hydrochloride in dentistry

Methadone hydrochloride (6-dimethylamino-4,4-diphenyl-3-heptanone hydrochloride) is prepared synthetically. Its pharmacologic activity is closely similar to that of morphine, although its chemical structure is quite different. The commercial preparations are racemic mixtures and the levo-isomer is responsible for the analgesic activity; d-methadone is only 1/8 to 1/50 as potent as the levo form, depending on the animal species and the analgesic test employed. The presence of the dextro isomer in the usual preparations does not appear to be of clinical therapeutic significance.

General Description and Actions • Methadone hydrochloride is a white, crystalline, odorless powder. It is soluble in water and in alcohol or chloroform, but practically insoluble in ether or glycerin. It has a bitter taste.

Methadone hydrochloride has high analgesic potency. In rats, dogs and man it exhibits analgesic activity at least equal to that of morphine and several times greater than that of meperidine hydrochloride. In therapeutic doses it does not produce noticeable sedation or respiratory depression, and its effects on smooth muscle and on the cardiovascular system are not prominent. Because of these properties, analgesia is achieved with only mild sedative effects and with less respiratory depression, cardiovascular disturbance and alimentary side-effects than equally effective doses of morphine. The drug is therefore useful for the relief of

pain but is of little value as a hypnotic for preanesthetic medication.

Absorption and Fate • Methadone hydrochloride is absorbed rapidly after intramuscular or subcutaneous injection, and is absorbed after oral administration much more effectively than morphine sulfate. It appears to be excreted largely by way of the bile, after partial degradation by the liver. The exact metabolic fate of methadone is not known. It is eliminated from the body about as quickly as morphine.

Side-effects and Toxicity • Methadone hydrochloride rarely produces euphoria, and there is less liability to addiction with this drug than with morphine. Tolerance may develop after prolonged use of methadone but this is not common nor as noticeable as morphine tolerance. The cough reflex is depressed and secretion is inhibited slightly. It may produce other untoward side-effects similar to those of morphine, but they are usually less severe with methadone.

As with morphine, the principal hazard from overdosage is respiratory depression. Maintenance of adequate respiratory exchange, and administration of oxygen when necessary, usually overcome the effects of moderate overdosage. In serious methadone poisoning, nalorphine hydrochloride may be employed as a specific antidote.

Usefulness in Dentistry • Methadone hydrochloride may be useful for the relief of pain whenever an agent with the potency of morphine is indicated. It is ineffectual in allaying apprehension, however, and it should be employed primarily for its analgesic property. If it is used for this purpose as preanesthetic medication, a suitable barbiturate may also be administered in order to achieve sedation. The chief advantage of methadone over morphine appears to be its relative safety with regard to respiratory depression, addiction liability and other untoward side effects.

Dosage • For moderate pain, 2.5 mg. of methadone hydrochloride given orally will usually suffice. It is well absorbed by the oral route and the effects of a single dose endure for 4 to 6 hours. For severe pain in adults, 5 to 10 mg., depending on the age and weight of the patient, may be administered orally or by subcutaneous or intramuscular injection. It is irritating locally, however, and injected doses may have to be divided between several sites. More than 5 mg. should not be given to the ambulatory patient. As with other narcotic drugs, the prescription of methadone hydrochloride is governed by the Harrison Narcotic Act.

Novobiocin—an informative report

Novobiocin is an antibiotic produced by *Streptomyces niveus* and *Streptomyces spheroides*. Its antimicrobial spectrum is limited largely to gram-positive organisms. Its most outstanding effect is against gram-positive cocci including *Micrococcus pyogenes var. aureus*,[1-8] pneumococci[3,4] and streptococci.[7,8] It is of limited value against most gram-negative bacteria;[2,6] however, there is evidence of its effectiveness against some strains of *Proteus vulgaris*.[6]

In vitro tests indicate that bacterial resistance to novobiocin may develop, and *M. pyogenes var. aureus* appears to become resistant to this drug with relative

rapidity.[1, 9, 10] The development of cross-resistance with other antibiotics has not been reported to date, and novobiocin has been employed effectively in medical practice for the treatment of infections associated with organisms that are resistant to other drugs.[1, 11]

Novobiocin is absorbed rapidly from the gastrointestinal tract after oral administration, producing peak concentration in the blood within one or two hours. High levels of the drug may persist for eight hours after administration. Novobiocin diffuses rapidly in pleural and ascitic fluids. It appears in relatively high concentrations in the bile and is excreted in the feces as well as by the kidney.[1]

Patients may develop hypersensitivity to novobiocin,[11] and the occurrence of skin rash[3, 6, 11, 12] and gastrointestinal disturbances[3] have been reported in a significant percentage of cases.

Novobiocin appears to have value in the treatment of infections due to organisms that are sensitive to this antibiotic but resistant to penicillin and to certain wide-spectrum antibiotics, and for infections in individuals who are sensitized or allergic to the more commonly used antibiotics. Available evidence does not indicate that novobiocin is clinically superior to penicillin, tetracyclines or chloramphenicol except for treatment of infections caused by organisms resistant to the latter agents, especially *M. pyogenes var. aureus*.

The suitability of novobiocin as a therapeutic adjunct in dentistry appears to be questionable. Use of the drug frequently is associated with the development of resistant organisms and the occurrence of numerous side-effects. These undesirable features might be considered of less significance if there were evidence of distinctive superiority of novobiocin over available antibiotics.

Novobiocin may have limited usefulness in instances where antibiotics with demonstrated value in dentistry (such as penicillin or the tetracyclines) are contraindicated. At present there is no adequate evidence from studies of the drug as employed specifically in infections of dental origin to justify the use of novobiocin except under these circumstances. The Council therefore has classified brands of novobiocin in Group C. The Council will review the status of novobiocin whenever significant new evidence of its value in dentistry becomes available.

1. Martin, W. J., and others. Streptonivicin (Albamycin): a new antibiotic; preliminary report. Proc. Mayo Clin. 30:540 Nov. 16, 1955.

2. Wilkins, J. R.; Lewis, C., and Barbiers, A. R. Streptonivicin, a new antibiotic. III. In vivo and vitro evaluation. Antibiotics & Chemotherapy 6:149 Feb. 1956.

3. Cook, Ellen, and others. Clinical experiences with novobiocin. Fourth Annual Symposium on Antibiotics, Washington, D. C., Oct. 17-19, 1956.

4. Limson, B. M., and Romansky, M. J. Novobiocin: a new antibiotic. Laboratory and clinical evaluation of 30 patients with bacterial pneumonia. Antibiotic Med. 2:277 April 1956.

5. Nichols, R. L., and Finland, Maxwell. Novobiocin, a limited bacteriologic and chemical study of its use in 45 patients. Antibiotic Med. 2:241 April 1956.

6. Lubash, G., and others. Novobiocin: a laboratory investigation. Antibiotic Med. 2:233 April 1956.

7. Mullins, J. F., and Wilson, C. J. Novobiocin treatment of pyodermas. Antibiotic Med. 2:201 April 1956.

8. Simon, H. J., and others. Studies on novobiocin: a new antimicrobial agent. Antibiotic Med. 2:205 April 1956.

9. Lin, F. K., and Coriell, L. L. Streptonivicin: laboratory and clinical studies in the pediatric age group. Antibiotics annual, 1955-1956. New York, Medical Encyclopedia, Inc., 1956, p. 634.

10. Noyes, H. W., and others. Novobiocin and PA 105: in vitro and in vivo studies on effectiveness against Micrococcus pyogenes. Antibiotics & Chemotherapy 6:450 July 1956.

11. Martin, W. J., and others. Novobiocin: further observations. Antibiotic Med. 2:258 April 1956.

12. David, N. A., and Burgner, P. R. Clinical effectiveness and safety of novobiocin. Antibiotic Med. 2:219 April 1956.

COUNCIL ON LEGISLATION

Testimony before Senate Armed Services Committee on doctor-draft amendments

On June 6, 1957, J. Claude Earnest, chairman of the Association's Council on Legislation, filed the following statement with the Senate Armed Services Committee in connection with that Committee's consideration of H.R. 6548, a bill to amend the so-called Doctors' Draft Act. Dr. Earnest presented similar testimony to the House Armed Services Committee on May 8, 1957. H.R. 6548 would, in effect, repeal the objectionable portions of the Doctors' Draft Act by limiting calls on dentists after June 30, 1957, to those under 35 years of age and basically liable for military service under the general provisions of the Universal Military Training and Service Act. The Senate Armed Services Committee reported the bill favorably to the Senate on June 7, 1957, where it was enacted by voice vote on June 12, 1957. The bill is now awaiting the President's signature.

I am J. Claude Earnest, a practicing dentist in Monroe, La. I am a reserve dental officer, a Colonel in the Air Force Reserve. I am here today in my capacity as chairman of the Council on Legislation of the American Dental Association to present the Association's views on H.R. 6548, a bill to amend the Universal Military Training and Service Act, as amended, in regard to physicians, dentists, and allied specialist categories. With me is Mr. Howard N. Greenblatt of Chicago, a staff member of the Council on Legislation.

POLICY OF AMERICAN DENTAL ASSOCIATION

The House of Delegates of the American Dental Association, at its 1956 annual session, adopted two resolutions which pertain to H.R. 6548. The House of Delegates is the policy determining body of the Association; it speaks for more than 80 per cent of the nation's dentists. These resolutions declare:

"*Resolved*, that the special liability provisions of Public Law 779 or the enactment of similar legislation be opposed."

"*Resolved*, that the national, state and local advisory committees to the Selective Service system be retained and their authority in no way be diminished."

Special Military Service Liability of Dentists • The prime purpose of H.R. 6548, as enacted by the House of Representatives, is to provide a method for stimulating dental and medical graduates who have a basic military service liability to accept commissions and active duty assignments as dental and medical officers upon completion of their professional training. The bill repeals as of June 30, 1957, those portions of Section 4(i) of the Universal Military Training and Service Act which impose the special military liability on dentists and physicians to which the Association is opposed.

Since November 1954, the American Dental Association has been inalterably opposed to any extension of the authority contained within Section 4(i) which imposes this special military service liability on dentists and physicians not otherwise obligated for military service—on those over 35 years of age, and on those of any age who have had extensive military service. In April 1955, the Association suggested an amendment to the bill that later became Public Law 118, 84th Congress, and that extended the doctor draft law until July 1, 1957, which would have limited military service liability to the class of person affected by H.R. 6548. This suggestion which is now being adopted was made on the basis that the application of this special military service liability was inequitable and, as events have shown, not required with respect to dentists. Prior to November 1954, the Association, although opposed to the enactment and maintenance of this authority to impose a special military service liability on dentists as dentists, cooperated with the Congress and with the Department of Defense to assure the armed

services an adequate supply of dental manpower during the Korean conflict.

With the enactment of H.R. 6548, the doctor draft act as we have known it since 1950, will be repealed. It is hoped that the Career Incentive Act and other programs developed by the armed services to strengthen their dental and medical services will insure us against a future need to consider the enactment of such an authority again. The American Dental Association believes H.R. 6548 to be compatible with its policy on this subject and offers no objection to this portion of the bill.

National Advisory Committee to Selective Service • Section 3 of H.R. 6548 would continue the National Advisory Committee arrangement in accord with the policy of the American Dental Association to which I referred previously.

The advisory committee structure established within Section 4(j) of the Universal Military Training and Service Act has performed exceptionally well under trying conditions and should not be permitted to expire. The committees at all three levels—national, state and local—have had to measure carefully the civilian community interest as well as the Armed Forces requirements in the selection of dentists and physicians for active service. The best testimonial to the work of these committees is the fact that the local Selective Service boards and the Armed Forces have placed increasingly greater reliance on the recommendations of these committees as the doctor draft program developed.

Unquestionably there will continue to be critical decisions to be made in the selection of dentists and physicians for active duty. It is estimated that within the next two years over 1,000 dental graduates will be unable to obtain commissions because the Armed Forces will have no immediate need for their services. Those for whom commissions are not available who enter civilian internships and residencies, or who undertake training pointed toward a teaching or research career, should be assured of a deferred status as long as the Armed Forces' quotas for dentists and physicians can be filled from volunteers. This can be assured best by retaining the advisory committees. Those who enter into teaching or research careers should be deferred as essential. There is still a serious shortage of dental faculty members and of dentists engaged in research. The advisory committees are the best protection for this critical situation.

Those for whom commissions are not available who enter into private practice should be deferred as long as the Armed Forces' quotas can be filled from volunteers, particularly if those denied commissions are married and have families. This can be assured best by retaining the advisory committees.

The advisory committees at all levels have acquired extraordinary skill and experience in carrying out their functions. Even if it is assumed that their functions will be somewhat diminished under the new program, it would be wise to retain them so that their services will be readily available in case of expanded military mobilization.

SUMMARY

In summary, I would like to state the position of the American Dental Association on H.R. 6548:

1. The Association has no objection to the system set out in H.R. 6548 for bringing dentists with basic military service liability to active duty as dentists during the next two fiscal years.

2. The Association strongly supports Section 3 of H.R. 6548 which continues the national, state and local advisory committees to Selective Service and the functions now performed by those committees, and urges this Committee to retain this provision of the bill.

On behalf of the American Dental Association, I desire to thank this Committee for the opportunity to testify on this important legislation.

COUNCIL ON DENTAL EDUCATION

Hospital dental internships and residencies approved by the Council on Dental Education (revised to July 1, 1957)

The Council on Dental Education has been delegated by the American Dental Association with the responsibility of evaluating the advanced dental education programs in hospitals and for listing as approved the programs which are conducted in accordance with the requirements approved by the House of Delegates. The requirements provide for the recognition of three types of dental internships—the straight, mixed, and rotating, and for a straight residency.

The straight internship or residency is defined as one which provides training in one major area of dental practice with its closely associated fields. The mixed internship is defined as one which provides training in two or more, but not all of the major areas of dental practice, and the rotating internship is defined as one which includes training in all of the major areas of dental practice. In the column headed "Type of Program and Number of Positions," the mixed or rotating internships have been indicated by name, but the straight internships and residencies, all of which include only one major area of dental practice, have been identified by the area in which training is offered.

Among the training programs available for the preparation of candidates for specialty board examination are the approved internships and residencies listed by the Council on Dental Education. It is the general policy of the recognized dental specialty boards to recognize training which a candidate has received in a straight internship or residency as acceptable toward the satisfaction of the educational requirements of the boards. The individual planning to prepare for a specialty board examination should write to the secretary of the board in which he is interested in order to acquaint himself with the specific requirements of that board and should consider it his responsibility to keep the specialty board informed of his plans and progress toward meeting the various requirements.

To date, seven fields of dentistry have been recognized by the Council on Dental Education as specialties. The boards representing these dental specialties are as follows:

American Board of Dental Public Health
Dr. Philip E. Blackerby, Jr., Secretary
250 Champion Street
Battle Creek, Michigan

American Board of Oral Pathology
Dr. Donald A. Kerr, Secretary
School of Dentistry
University of Michigan
Ann Arbor, Michigan

American Board of Oral Surgery
Dr. Leslie M. FitzGerald, Secretary
718 Roshek Building
Dubuque, Iowa

American Board of Orthodontics
Dr. Wendell L. Wylie, Secretary
College of Dentistry
University of California
University Medical Center
San Francisco, California

American Board of Pedodontics
Dr. Ralph L. Ireland, Secretary
College of Dentistry
University of Nebraska
Lincoln, Nebraska

American Board of Periodontology
Dr. Harold J. Leonard, Secretary
745 Fifth Avenue
New York 22, New York

American Board of Prosthodontics
Dr. S. Howard Payne, Secretary
School of Dentistry
University of Buffalo
3435 Main Street
Buffalo 14, New York

In general, the applicant should write to the Chief of Dental Service of the hospital in which he is interested for details relative to admission requirements and application procedure.

An applicant for a position as an intern or resident in any of the federal hospitals must be a citizen of the United States. In order to be eligible for a dental internship in an Army hospital, the applicant must also be completing his senior year of dental school or have completed his dental education within a period not exceeding 12 months prior to the date of commencement of the internship. An applicant for a Navy internship must be completing his senior year of dental school and must agree to accept a superseding appointment as lieutenant junior grade in the regular Navy Dental Corps. Residencies conducted by the Navy are open to regular dental officers of the U. S. Navy. Inquiries and applications for appointment as an intern or resident in one of the federal hospitals must be addressed as follows:

Army:
Internship:
Office of the Surgeon General
Department of the Army
Washington 25, D. C.
Attention: Personnel Division
Residency:
Through regular military channels

Navy:
Internship:
District Dental Office nearest
Naval District Headquarters
or
Chief of the Dental Division
Bureau of Medicine and Surgery
Department of the Navy
Washington 25, D. C.
Residency:
Through regular military channels

U. S. Public Health Service:
The Surgeon General
Public Health Service
U. S. Department of Health,
Education and Welfare
Washington 25, D. C.
Attention: Chief, Dental Branch
Division of Hospitals

Veterans Administration:
Manager of the hospital conducting the program in which you are interested

All of the internships and residencies that have been approved or provisionally approved are recognized by the Council on Dental Education as accredited. The training programs in the following list designated with an asterisk (*) are provisionally approved; all others are approved.

Since changes are made in the chiefs of dental service from time to time, this listing does not indicate the names of these individuals. This information is available from the individual hospitals or may be obtained from the Council on Dental Education.

The code numbers (1 to 51) immediately following the name of the hospital indicate the educational institution with which the dental education program

in the hospital is affiliated. The names of affiliated educational institutions appear at the end of this listing. The code letter (A) following the name of the hospital shows the training program is available to women and the code letter (B) indicates that graduates of foreign schools will be considered for admission.

As additional programs are reviewed or changes in the types of training provided in currently approved programs are made, supplemental listings will be published in THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
ALABAMA					
University Hospital (1-A,B) 619 South 19th Street Birmingham 3, Alabama	Internship Oral surgery (2) Residency Oral surgery (3)	 12 24	450	 February February	 $1,200. 1,300.–1,400.
CALIFORNIA					
Herrick Memorial Hospital (A) 2001 Dwight Way Berkeley 4, California	Internship Oral surgery (1)	 12	244	 —	 1,200
General Hospital of Fresno County (A) 4475 E. Ventura Fresno, California	Internship Oral surgery (1)	 12	536	 March	 3,600.
Los Angeles County General Hospital (2-A) 1200 North State Street Los Angeles, California	Internship Oral surgery (6) Residency Oral surgery (4)	 12 12	3,504	 Anytime —	 1,500. 2,952.
Highland-Alameda County Hospital (3-A) 2701 - 14th Avenue Oakland, California	Internship Oral surgery (1) Residency Oral surgery (2)	 12 24	429	 March March	 1,200. 2,340.
San Francisco Hospital (3) (Stanford-College of Physicians and Surgeons Service) 22nd & Potrero Streets San Francisco, California	Internship Rotating (1) Internship Oral surgery (1) Residency Oral surgery (1)	 12 12 24	1,203	 May May May	 1,440. 1,440. 2,100.–2,700.
San Francisco Hospital (4-A,B) (University of California Service) 22nd & Potrero Streets San Francisco, California	Internship Oral surgery (1)	 12	1,203	 March	 1,680.
CONNECTICUT					
Hartford Hospital (A,B) 80 Seymour Street Hartford, Connecticut	Internship Oral surgery (1)	 12	820	 December	 300.
St. Francis Hospital (A,B) 114 Woodland Street Hartford 5, Connecticut	Internship Oral surgery (1)	 12	588	 January	 1,200.–1,500.
Norwich State Hospital (A) Box 508 Norwich, Connecticut	Internship Rotating (1)	 12	2,956	 March	 2,460.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
St. Mary's Hospital Franklin Street Waterbury, Connecticut	Internship Rotating (2)	12	347	—	$1,800.
Waterbury Hospital 64 Robbins Street Waterbury, Connecticut	Internship Rotating (2)	12	370	February	2,400.
DELAWARE					
The Delaware Hospital, Inc. 501 West 14th Street Wilmington 99, Delaware	Internship Oral surgery (2) Residency Oral surgery (2)	12 12	380	February February	2,280.–3,120. 2,640.–3,540.
DISTRICT OF COLUMBIA					
Central Dispensary & Emergency Hospital 1711 New York Avenue Washington, D. C.	Internship Oral surgery (1)	12	400	March	2,400.
Children's Hospital of the District of Columbia (A,B) 2125 - 13th Street, N.W. Washington, D. C.	Internship Pedodontics (1)	12	225	—	1,500.
District of Columbia General Hospital (5-6-A) 19th and Massachusetts Avenues, S.E. Washington, D. C.	Internship Oral surgery (3)	12	1,200	March	2,500.
Episcopal Eye, Ear and Throat Hospital 1147 - 15th Street, N.W. Washington 5, D. C.	Internship Oral surgery (2)	12	100	January	1,200.
Freedmen's Hospital (6-A) 6th and Bryant Streets, N.W. Washington, D. C.	Internship Oral surgery (2)	12	485	January	2,800.
The George Washington University Hospital (7-A,B) 901 Twenty-Third Street, N.W. Washington 7, D. C.	Residency Oral surgery (1)	12	410	December	1,800.–2,400.
Providence Hospital (A) 12 and Varnum Street, N.E. Washington, D. C.	Internship Rotating (2)	12	350	—	3,000.
St. Elizabeth's Hospital (7-A) Nichols Avenue Washington 20, D. C.	Internship Rotating (3-4)	12	7,641	April	3,100.
FLORIDA					
Florida State Hospital Chattahoochee, Florida	Internship Rotating (6)	12	6,900	March	3,900.
Jackson Memorial Hospital (8) 1000 N.W. 17th Street Miami, Florida	Residency Oral surgery (2)	24	575	November	900.–1,320.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
GEORGIA					
Grady Memorial Hospital (9-A) 36 Butler Street, S.E. Atlanta 3, Georgia	Residency Oral surgery (2)	24	670	March	$1,740.–2,040.
Milledgeville State Hospital (A,B) Milledgeville, Georgia	Internship Rotating (2)	12	9,000	April	1,500.
ILLINOIS					
Children's Memorial Hospital (10) 707 Fullerton Avenue Chicago, Illinois	Internship Pedodontics (1)	12	225	April	900.
	Residency Pedodontics (2)	12		April	900.
University of Chicago Clinics (47-A,B) 950 E. 59th Street Chicago, Illinois	Internship Rotating (5)	12	409	January	2,100.
Carle Memorial Hospital (A,B) 602 West University Urbana, Illinois	Internship Oral surgery (2)	12	101	February	2,220.
	Residency Oral surgery (2)	12		February	2,220.
INDIANA					
Indiana University Medical Center (11-A) 1100 West Michigan Street Indianapolis, Indiana	Internship Oral surgery (2)	12	695	March	1,980.
	Residency Oral surgery (1)	12		March	2,580.
Indianapolis General Hospital (11-A,B) 960 Lock Street Indianapolis, Indiana	Internship Oral surgery (2)	12	604	January	1,800.
	Residency Oral surgery (1)	12		January	2,460.
IOWA					
State University of Iowa Hospitals (12) Newton Road Iowa City, Iowa	Internship Oral surgery (2)	12	1,000	March	1,500.
	Residency Oral surgery (2)	12		March	1,680.
KANSAS					
University of Kansas Hospitals (20) 39th and Rainbow Blvd. Kansas City, Kansas	Internship Oral surgery (1)	12	560	—	300.
KENTUCKY					
Louisville General Hospital (13-A) 323 East Chestnut Street Louisville, Kentucky	Internship Oral surgery (2)	12	441	December	840.
	Residency Oral surgery (1)	12		December	2,041.
LOUISIANA					
Charity Hospital of Louisiana (14-A) 1532 Tulane Avenue New Orleans, Louisiana	Internship Oral surgery (4)	12	3,191	October	900.
	Residency Oral surgery (4)	36		October	1,200.–1,800.
Confederate Memorial Medical Center (A) 1541 Kings Highway Shreveport, Louisiana	Internship Oral surgery (1)	12	850	October	1,200.
	Residency Oral surgery (1)	24		October	1,500.–1,800.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
MARYLAND					
Mercy Hospital, Inc. (15-B) North Calvert Street Baltimore 2, Maryland	Internship Oral surgery (1)	12	263	—	$3,300.
Provident Hospital and Free Dispensary (15-A) 1514 Division Street Baltimore 17, Maryland	Internship Oral surgery (1)	12	130	March	1,200.
Sinai Hospital of Baltimore, Inc. (A,B) 1714 East Monument Street Baltimore 5, Maryland	Internship Rotating (1) Residency Oral surgery (1)	12 12	312	March March	1,200. 1,500.
University Hospital, University of Maryland (15-A,B) 22 South Greene Street Baltimore 1, Maryland	Internship Mixed (4)	12	600	December	1,200.
MASSACHUSETTS					
Beth Israel Hospital (A,B) 330 Brookline Avenue Boston, Massachusetts	Internship Oral surgery (1)	12	366	February	360.
The Boston City Hospital (16-A) 818 Harrison Avenue Boston, Massachusetts	Internship Oral surgery (4) Residency Oral surgery (2)	12 12	3,000	January January	1,104. 1,344.–1,584.
The Children's Hospital (17) Children's Medical Center 300 Longwood Avenue Boston, Massachusetts	Internship Pedodontics (2)	12	350	March	900.
Massachusetts General Hospital (17-B) Fruit Street Boston, Massachusetts	Internship Oral surgery (2)	12	889	January	600.
Holyoke Hospital (A,B) 575 Beech Street Holyoke, Massachusetts	Internship Rotating (1)	12	181	February	600.
Westfield State Sanatorium (A,B) East Mountain Road Westfield, Massachusetts	Internship Rotating (1)	12	191	February	2,820.
The Memorial Hospital (A,B) 119 Belmont Street Worcester 5, Massachusetts	Internship Rotating (1)	12	350	January	1,200.
Worcester City Hospital (B) 71 Jaques Avenue Worcester, Massachusetts	Internship Oral surgery (2)	12	485	December	1,380.
MICHIGAN					
University of Michigan Hospital (18) 1313 East Ann Street Ann Arbor, Michigan	Residency Oral surgery (2)	24	1,200	January	1,284.–1,740.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
Detroit Receiving Hospital 1326 St. Antoine Street Detroit, Michigan	Internship Oral surgery (1) Residency Oral surgery (2)	12 24	701	— —	$3,800. 3,800.
Henry Ford Hospital West Grand Blvd. Detroit 2, Michigan	Residency Oral surgery (4)	24	850	1 yr. prior appointment	2,700.–3,300.
Mount Carmel Mercy Hospital (A,B) 6071 West Outer Drive Detroit, Michigan	Internship Oral surgery (1) Residency Oral surgery (1)	12 12	700	February February	1,800.–2,400 1,800.–2,400.
Sinai Hospital of Detroit (A,B) 6767 West Outer Drive Detroit 35, Michigan	Internship Rotating (1)	12	230	December	2,700.
MINNESOTA Mayo Foundation for Medical Education and Research (51-A) 102 Second Avenue, S.W. Rochester, Minnesota	Residency Oral surgery (4)	24	1,400	6 to 12 mo. in advance	2,100.
University of Minnesota Hospitals (19) University of Minnesota Minneapolis 14, Minnesota	Residency Oral surgery (1)	12	700	—	1,500.
MISSOURI Kansas City General Hospital No. 1 (20-A,B) 24th and Cherry Kansas City, Missouri	Residency Oral surgery (2)	24	600	March	1,800.
Mercy Children's Hospital (20-A,B) 1710 Independence Avenue Kansas City 6, Missouri	Internship Pedodontics (4)	12	125	March	3,600.
Jewish Hospital (A) 216 S. Kingshighway St. Louis, Missouri	Internship Rotating (1)	12	485	—	900.–1,500.
NEW JERSEY Medical Center (50) 50 Baldwin Jersey City 4, New Jersey	Internship Rotating (9-12) Residency Oral surgery (2)	12 24	1,400	— —	1,000. 1,750.–2,400.
Monmouth Memorial Hospital (A) 3rd and Pavillion Avenues Long Branch, New Jersey	Internship Mixed (1)	12	328	May	1,200.
The Mountainside Hospital (A) Bay and Highland Avenues Montclair, New Jersey	Internship Mixed (1)	12	327	April	2,400.
Harrison S. Martland Medical Center (A) 116 Fairmount Avenue Newark, New Jersey	Internship Oral surgery (2)	12	700	December	1,356.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
Newark Beth Israel Hospital (A) 201 Lyons Avenue Newark 8, New Jersey	Internship Rotating (2)	12	486	January	$ 900.
North Hudson Hospital (A) 4300 Park Avenue Weehawken, New Jersey	Internship Oral surgery (1)	12	130	—	300.
NEW YORK†					
Bronx Municipal Hospital Center (40-A) Pelham Parkway & Eastchester Road Bronx, New York	Internship Rotating (2) Oral surgery (2) Residency Oral surgery (2)	12 12 12	1,323	— — —	855. 855. 1 255.–1,885.
Lincoln Hospital (A) 320 Concord Avenue Bronx 54, New York	Internship Oral surgery (3)	12	404	—	885.
Montefiore Hospital (21-22-A) 210th Street and Bainbridge Avenue Bronx 67, New York	Internship Rotating (4)	12	650	—	480.
Morrisania City Hospital (23-A) 168th St. and Gerard Avenue Bronx 52, New York	Internship Oral surgery (2)	12	500	April	855.
Coney Island General Hospital (A) Ocean Parkway and Avenue Z Brooklyn 35, New York	Internship Oral surgery (1)	12	500	December	858.
Cumberland Hospital (21-A) 39 Auburn Place Brooklyn 5, New York	Internship Oral surgery (2)	12	360	November	860.
Greenpoint Hospital (A) Kingsland and Skillman Avenues Brooklyn 11, New York	Internship Oral surgery (2)	12	313	December	855.
Jewish Hospital of Brooklyn (A) 555 Prospect Place Brooklyn 38, New York	Internship Mixed (1)	12	499	November	600.
Kings County Medical Center (24-A) Clarkson Avenue Brooklyn 3, New York	Internship Oral surgery (7) Residency Oral surgery (3)	12 24	3,295	— —	780. 1,260.–1,860.
Jewish Chronic Disease Hospital (24-A) 86 East 49th Street Brooklyn 3, New York	Internship Rotating (4) Residency Prosthodontics (1)	12 12	810	December March	900. 2,100.
Buffalo General Hospital (25) 100 High Street Buffalo, New York	Internship Oral surgery (1) Residency Oral surgery (1)	12 24	650	January January	1,800. 2,100.–2,400.

†To be eligible for appointment as a dental intern or resident, the applicant must be licensed by the state or must be graduated within the past two years from a dental school registered by the State Department of Education and hold a permit to practice.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
Children's Hospital of Buffalo (25) 219 Bryant Street Buffalo, New York	Internship Pedodontics (2)	12	282	March	$1,000.–1,500.
	Residency Pedodontics (2)	12		March	1,000.–1,500.
Elmhurst General Hospital 79-01 Broadway Elmhurst 73, New York	Internship Oral surgery (2)	12	970	November	855.
	Residency Oral surgery (1)	12		November	1,255.
Millard Fillmore Hospital (25-A) 875 Lafayette Avenue Buffalo 9, New York	Internship Oral surgery (1)	12	580	February	2,760.
	Residency Oral surgery (1)	24		February	3,060.
Meadowbrook Hospital (22) Hempstead Turnpike Hempstead, New York	Residency Oral surgery (1)	12	600	January	2,700.
Mary Immaculate Hospital (A) 152-11 89th Avenue Jamaica 2, New York	Internship Rotating (3)	12	350	May	1,800.
Queens General Hospital (23-A) 82-68 164th Street Jamaica 32, New York	Internship Oral surgery (3)	12	912	—	855.
	Residency Oral surgery (1)	12		—	1,885.
Bellevue Hospital (22-A) 1st Avenue and 27th Street New York, New York	Internship Oral surgery (6)	12	4,000	February	855.
	Residency Oral surgery (2)	12		February	855.
Beth Israel Hospital (22-A) 10-17 Nathan D. Perlman Place New York 3, New York	Internship Rotating (3)	12	357	January	1,140.
Bird S. Coler Memorial Hospital and Home (23) Welfare Island New York, New York	Internship Mixed (2)	12	1,836	—	852.
Flower and Fifth Avenue Hospitals (23) 1 East 105th Street New York 29, New York	Internship Oral surgery (1)	12	532	December	—
Goldwater Memorial Hospital (A) Welfare Island New York 17, New York	Internship Rotating (2)	12	1,500	May	855.
Gouverneur Hospital (A) Gouverneur and Water Streets New York, New York	Internship Oral surgery (2)	12	190	—	855.
Harlem Hospital 136th Street and Lenox Avenue New York, New York	Internship Oral surgery (5)	12	882	December	855.
	Residency Oral surgery (1)	12		December	855.
Hospital for Joint Diseases 1919 Madison Avenue New York, New York	Internship Mixed (1)	12	300	January	600.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
Jewish Memorial Hospital 196th Street and Broadway New York, New York	Internship Rotating (1)	12	185	January	$ 900.
Lenox Hill Hospital (23-A) 111 East 76th Street New York 21, New York	Internship Rotating (1)	12	600	December	960.
Metropolitan Hospital (A) 1901 First Avenue New York, New York	Internship Oral surgery (3) Residency Oral surgery (1)	12 12	1,100	— —	855. 1,885.
The Mount Sinai Hospital (21-A) Fifth Avenue and 100th Street New York, New York	Internship Oral surgery (4) Residency Oral surgery (2)	12 12	1,025	December December	1,044. 1,344.
The New York Hospital (26-A) 525 East 68th Street New York 21, New York	Internship Oral surgery (2) Residency Oral surgery (1)	12 12	1,200	January January	1,152. 1,776.
New York Polyclinic Medical School and Hospital 345 West 50th Street New York 19, New York	Internship Rotating (3)	12	394	December	1,200.
Roosevelt Hospital (A) 428 West 59th Street New York, New York	Internship Oral surgery (1)	12	461	December	1,200.
St. Luke's Hospital (A) Morningside Heights New York 25, New York	Internship Oral surgery (1)	12	478	—	420.
Sydenham Hospital (A) West 124th Street and Manhattan Avenue New York 27, New York	Internship Rotating (2)	12	259	December	885.
The Rochester General Hospital 501 Main Street West Rochester 8, New York	Internship Rotating (1)	12	332	—	900.–1,500.
Strong Memorial Hospital (27-A) 260 Crittenden Boulevard Rochester 20, New York	Internship Rotating (1) Residency Oral surgery (2)	12 12	736	March March	3,000. 3,200.–3,400.
Sea View Hospital (A) 460 Brielle Avenue Staten Island 14, New York	Internship Rotating (2-4) Residency Prosthodontics (2-4)	12 12	1,400	January January	1,884. 1,884.
Grasslands Hospital (A) Valhalla, New York	Internship Rotating (3) Residency Oral surgery (1)	12 12	800	January January	1,800. 2,800.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
NORTH CAROLINA					
Charlotte Memorial Hospital (A) 1400 Scott Avenue Charlotte 3, North Carolina	Internship Rotating (2)	12	352	—	$1,200.
Duke University Hospital (28-A,B) Durham, North Carolina	Internship Oral surgery (1)	12	700	October	600.
	Residency Oral surgery (2)	12		or April	2,800.
OHIO					
Cambridge State Hospital (A) Cambridge, Ohio	Internship Rotating (2)	12	3,000	May	2,400.
Cincinnati General Hospital (29-A) 3231 Burnet Avenue Cincinnati 29, Ohio	Internship Oral surgery (4-6)	12	875	January	600.
	Residency Oral surgery (2)	12		—	2,600.
Cleveland City Hospital (30-A) 3395 Scranton Road Cleveland 9, Ohio	Internship Oral surgery (1)	12	1,200	October	1,500.
	Residency Oral surgery (1)	12		—	1,800.
Mt. Sinai Hospital of Cleveland (30-B) 1800 East 105th Street Cleveland, Ohio	Internship Oral surgery (1)	12	350	January	1,800.
	Residency Oral surgery (1)	12		January	2,580.
St. Luke's Hospital (A,B) 11311 Shaker Boulevard Cleveland 4, Ohio	Internship Mixed (1)	12	518	March	1,200.
University Hospital (31-A) Ohio State University Columbus 10, Ohio	Internship Oral surgery (2)	12	600	November	1,500.
	Residency Oral surgery (2)	24		November	2,100.–3,000.
Miami Valley Hospital (A,B) 1 Wyoming Street Dayton 9, Ohio	Internship Rotating (1)	12	620	March	2,700.
The Youngstown Hospital Association (A) Gypsy Lane and Goleta Avenue Youngstown, Ohio	Internship Rotating (1)	12	800	January	1,800.
OKLAHOMA					
University of Oklahoma Medical Center (41) 800 N.E. 13th Street Oklahoma City, Oklahoma	Internship Oral surgery (2)	12	248	—	1,200.
PENNSYLVANIA					
Geisinger Memorial Hospital and Foss Clinic Danville, Pennsylvania	Internship Oral surgery (1)	12	350	January	1,800.
	Residency Oral surgery (1)	12		January	1,800.
Harrisburg Hospital (A) Front and Mulberry Streets Harrisburg, Pennsylvania	Internship Oral surgery (1)	12	500	July	2,400.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
Albert Einstein Medical Center (32-33-34-A) (Northern Division) York and Tabor Roads Philadelphia 41, Pennsylvania	Internship Rotating (4)	12	461	February	$ 900.
Albert Einstein Medical Center (32-A,B) (Southern Division) 1429 South 5th Street Philadelphia 47, Pennsylvania	Internship Rotating (1)	12	316	January	900.
Children's Hospital of Philadelphia (32-A,B) 1740 Bainbridge Street Philadelphia 46, Pennsylvania	Residency Pedodontics (1)	12	175	December	1,200.
Hospital of the University of Pennsylvania (33) 3400 Spruce Street Philadelphia, Pennsylvania	Internship Oral surgery (2)	12	800	—	600.
Pennsylvania Hospital (33-34-A,B) Eighth and Spruce Streets Philadelphia 7, Pennsylvania	Residency Oral surgery (1)	24	436	January	240.–360.
Philadelphia General Hospital— Blockley Division (32-A,B) 34th and Curie Avenue Philadelphia, Pennsylvania	Internship Rotating (6) Residency Oral surgery (2)	12 12	1,760	January January	713. 1,456.
St. Christopher's Hospital for Children (34-A) 2600 North Lawrence Street Philadelphia, Pennsylvania	Internship Pedodontics (1)	12	100	January	1,200.
St. Joseph's Hospital (A,B) 16th Street and Girard Avenue Philadelphia 30, Pennsylvania	Internship Rotating (1)	12	200	February	1,800.
Allegheny General Hospital (A) 320 East North Avenue Pittsburgh 12, Pennsylvania	Residency Oral surgery (2)	12	506	—	2,400.
Children's Hospital of Pittsburgh (35) DeSoto Street Pittsburgh 13, Pennsylvania	Internship Pedodontics (1)	12	160	—	600.
Elizabeth Steel Magee Hospital (35-B) Forbes and Halket Streets Pittsburgh 13, Pennsylvania	Residency Oral surgery (1)	12	363	January	1,500.
Montefiore Hospital (35) 5th Avenue at Darragh Street Pittsburgh, Pennsylvania	Internship Rotating (1)	12	298	—	1,000.
St. Francis General Hospital and Rehabilitation Institute (35) 45th Street at Penn Avenue Pittsburgh 1, Pennsylvania	Internship Oral surgery (1) Residency Oral surgery (1)	12 12	731	February —	2,400. 2,400.
The Western Pennsylvania Hospital (35-A) 4800 Friendship Avenue Pittsburgh 24, Pennsylvania	Internship Oral surgery (1)	12	552	January	2,400.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
Western State Psychiatric Institute and Clinic (35-B) 3811 O'Hara Street Pittsburgh, Pennsylvania	Internship Rotating (1)	12	150	January	$1,800.
	Residency Oral surgery (1)	12		January	1,800.
RHODE ISLAND					
Rhode Island Hospital (A,B) Eddy Street Providence, Rhode Island	Internship Rotating (1)	12	600	January	900.
TENNESSEE					
Baroness Erlanger Hospital (B) 261 Wiehl Street Chattanooga 3, Tennessee	Internship Oral surgery (1)	12	625	April	1,800.
John Gaston City-County Hospital (42) 860 Madison Avenue Memphis, Tennessee	Internship Oral surgery (1)	12	454	—	1,680.
George W. Hubbard Hospital (36-B) 1005 - 18th Avenue, North Nashville, Tennessee	Internship Rotating (2)	12	200	May	1,200.
TEXAS					
Children's Medical Center (A) 2306 Welborn Dallas 19, Texas	Internship Pedodontics (2)	12	126	—	1,800.
Parkland Memorial Hospital (48-49-A) 5201 Harry Hines Boulevard Dallas 19, Texas	Internship Oral surgery (1)	12	588	January	1,200.
	Residency Oral surgery (2)	12		January	1,500.
Peter Smith Hospital (A,B) 1500 South Main Street Fort Worth, Texas	Internship Oral surgery (1)	12	200	May	600.
Jefferson Davis Hospital (37-A,B) 1801 Buffalo Drive Houston, Texas	Internship Oral surgery (2)	12	550	January	600.
	Residency Oral surgery (2)	12		January	900.
M. D. Anderson Hospital and Tumor Institute (37-A) 6723 Bertner Drive Houston 25, Texas	Residency Oral surgery (1)	12	182	—	1,800.
Robert B. Green Memorial Hospital (37-A,B) 515 Morales San Antonio 7, Texas	Internship Oral surgery (1)	12	242	—	1,200.
	Residency Oral surgery (1)	12		—	1,800.
VIRGINIA					
Medical College of Virginia Hospital Division (38-A) 1200 East Broad Street Richmond, Virginia	Internship Oral surgery (2)	12	1,200	February	900.
	Residency Oral surgery (2)	24		—	1,800.–3,000.
WASHINGTON					
King County Hospital System (46) 325 Ninth Avenue Seattle 4, Washington	Internship Oral surgery (1)	12	445	—	1,440.–1,704.

NONFEDERAL HOSPITALS

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds	Submit application by	Stipend
WEST VIRGINIA					
North Wheeling Hospital (B) North Main Street Wheeling, West Virginia	Residency Oral surgery (1)	12	250	June	$2,400.
Ohio Valley General Hospital Wheeling, West Virginia	Residency *Oral surgery (1)	24	287	January	3,000.–3,600.
WISCONSIN					
Milwaukee Children's Hospital (39-A) 721 North 17th Street Milwaukee, Wisconsin	Residency Pedodontics (2)	12	160	March	1,800.

*Second year of residency is provisionally approved.

FEDERAL HOSPITALS

Information has not been included in this listing on the stipends for training programs in the federal hospitals since they are based on government pay scales and the rank of the trainee. In addition, the dates by which applications must be submitted for appointment to a training program in one of the federal hospitals have been omitted for these dates may vary from year to year at the discretion of the hospitals or the federal dental departments. The number of positions available in the training programs offered in the Naval hospitals is determined annually by the Bureau of Medicine and Surgery of the Department of the Navy.

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds
UNITED STATES ARMY			
CALIFORNIA			
Letterman Army Hospital San Francisco, California	Internship Rotating (6) Residency Oral surgery (1) Prosthodontics (1)	 12 24 24	1,000
COLORADO			
Fitzsimons Army Hospital Denver 8, Colorado	Internship Rotating (3) Residency Oral surgery (1) Prosthodontics (1)	 12 24 24	1,250
DISTRICT OF COLUMBIA			
Armed Forces Institute of Pathology Walter Reed Army Medical Center Washington, D. C.	Residency Oral pathology (4)	 24	1,000
Walter Reed Army Hospital 6825 16th Street, N.W. Washington 12, D. C.	Internship Rotating (6) Residency Oral surgery (2) Prosthodontics (2)	 12 24 24	1,250

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds
PENNSYLVANIA			
Valley Forge Army Hospital	Internship		1,000
Phoenixville, Pennsylvania	Rotating (4)	12	
TEXAS			
William Beaumont Army Hospital	Internship		800
El Paso, Texas	Rotating (4)	12	
Brooke Army Hospital	Internship		1,000
Brooke Army Medical Center	Rotating (6)	12	
Ft. Sam Houston, Texas	Residency		
	Oral surgery (2)	24	
	Prosthodontics (2)	24	
WASHINGTON			
Madigan Army Hospital	Internship		650
Tacoma, Washington	Rotating (4)	12	
UNITED STATES NAVY			
CALIFORNIA			
U. S. Naval Hospital	Internship		1,000
Camp Pendleton, California	Rotating	12	
U. S. Naval Hospital	Internship		900
Corona, California	Rotating	12	
U. S. Naval Hospital	Internship		1,250
Oakland, California	Rotating	12	
	Residency		
	Oral surgery	12	
U. S. Naval Hospital	Internship		2,375
San Diego 34, California	Rotating	12	
	Residency		
	Oral surgery	24	
ILLINOIS			
U. S. Naval Hospital	Internship		850
Great Lakes, Illinois	Rotating	12	
	Residency		
	Oral surgery	12	
MARYLAND			
U. S Naval Dental School	Residency		1,225
National Naval Medical Center	Oral pathology	12	
8901 Wisconsin Avenue	Oral surgery	12	
Bethesda 14, Maryland	Periodontics	12	
	Prosthodontics	12	
MASSACHUSETTS			
U. S. Naval Hospital	Internship		600
Chelsea, Massachusetts	Rotating	12	
	Residency		
	Oral surgery	12	
NEW YORK			
U. S. Naval Hospital	Internship		2,913
St. Albans 25, New York	Rotating	12	
	Residency		
	Oral surgery	24	

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds
PENNSYLVANIA			
U. S. Naval Hospital	Internship		1,025
17th and Pattison Avenue	Rotating	12	
Philadelphia 45, Pennsylvania	Residency		
	Oral surgery	12	
VIRGINIA			
U. S. Naval Hospital	Internship		2,150
Portsmouth, Virginia	Rotating	12	
	Residency		
	Oral surgery	12	
UNITED STATES PUBLIC HEALTH SERVICE			
CALIFORNIA			
U. S. Public Health Service Hospital (A)	Internship		660
15th Avenue and Lake Street	Rotating (4)	12	
San Francisco, California			
ILLINOIS			
U. S. Public Health Service Hospital (10-A)	Internship		204
4141 North Clarendon Avenue	Rotating (2)	12	
Chicago 13, Illinois			
LOUISIANA			
U. S. Public Health Service Hospital (14-A)	Internship		400
210 State Street	Rotating (4)	12	
New Orleans, Louisiana			
MARYLAND			
U. S. Public Health Service Hospital (A)	Internship		366
Wyman Park Drive and 31st Street	Rotating (4)	12	
Baltimore 11, Maryland			
MASSACHUSETTS			
U. S. Public Health Service Hospital (A)	Internship		278
77 Warren Street	Rotating (3)	12	
Boston 35, Massachusetts			
NEW YORK			
U. S. Public Health Service Hospital (A)	Internship		710
Bay Street	Rotating (5)	12	
Staten Island 4, New York	Residency		
	Oral surgery (1)	12	
VIRGINIA			
U. S. Public Health Service Hospital (A)	Internship		238
Hampton Boulevard	Rotating (3)	12	
Norfolk 9, Virginia			
WASHINGTON			
U. S. Public Health Service Hospital (46-A)	Internship		342
14th South and Judkins	Rotating (5)	12	
Seattle 14, Washington			
VETERANS ADMINISTRATION			
ALABAMA			
Veterans Administration Hospital (1-A)	Residency		479
700 South 19th Street	Oral surgery (4)	36	
Birmingham, Alabama	Periodontics (3)	24	
	Prosthodontics (2)	24	

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds
Veterans Administration Hospital (1-9-A) Tuskegee, Alabama	Internship Rotating (4)	12	2,204
CALIFORNIA Veterans Administration Center (2-A) Los Angeles, California	Internship Rotating (1)	12	3,633
GEORGIA Veterans Administration Hospital (9-A) 5998 Peachtree Road, N.E. Atlanta, Georgia	Residency Oral surgery (2)	24	300
ILLINOIS Veterans Administration Hospital Hines, Illinois (10-43-44-A)	Internship Rotating (2)	12	2,163
IOWA Veterans Administration Hospital (12) Iowa City, Iowa	Internship Rotating (2) Residency Prosthodontics (2)	12 12	456
KANSAS Veterans Administration Center (20) Wadsworth, Kansas	Internship Rotating (1)	12	944
MICHIGAN Veterans Administration Hospital (18-A) Fuller Road Ann Arbor, Michigan	Residency Prosthodontics (1)	24	384
MINNESOTA Veterans Administration Hospital (19-A) 54th and 48th Avenue, South Minneapolis, Minnesota	Residency Oral surgery (1)	12	973
MISSOURI Veterans Administration Hospital (20-A) 4801 Linwood Boulevard Kansas City 28, Missouri	Internship Rotating (1) Residency *Oral surgery (1)	12 24	500
NEW YORK Veterans Administration Hospital (21-A) 130 West Kingsbridge Road Bronx 68, New York	Residency Oral surgery (1) Prosthodontics (1)	24 24	1,480
Veterans Administration Hospital (22-A) 800 Poly Place Brooklyn 9, New York	Internship Rotating (2)	12	1,000
Veterans Administration Hospital (25-A) 3495 Bailey Avenue Buffalo, New York	Internship Rotating (1) Oral surgery (1) Residency Oral surgery (2)	12 12 24	1,000

Name and location of hospital	Type of program and number of positions	Length of approved program (months)	Number of beds
Veterans Administration Hospital (22-A) 408 First Avenue New York, New York	Residency Oral surgery (1) Periodontics (1-2)	 12 24	1,252
NORTH CAROLINA Veterans Administration Hospital (28-45-A) Fulton Street and Erwin Road Durham, North Carolina	Residency Oral surgery (1)	 24	500
PENNSYLVANIA Veterans Administration Hospital (35-A) University Drive Pittsburgh 40, Pennsylvania	Residency Oral surgery (1)	 24	1,050
TENNESSEE Veterans Administration Medical Teaching Group Hospital (A) Park and Getwell Memphis 15, Tennessee	Residency Prosthodontics (2)	 24	1,215
TEXAS Veterans Administration Hospital (37-A) 2002 Holcombe Boulevard Houston 31, Texas	Internship Rotating (2) Residency Oral surgery (1) Prosthodontics (1)	 12 24 24	1,110
WISCONSIN Veterans Administration Center (39-A) Wood, Wisconsin	Internship Rotating (2) Residency Oral surgery (1) Periodontics (2) Prosthodontics (1)	 12 36 24 24	1,275

CODE LIST OF AFFILIATED EDUCATIONAL INSTITUTIONS

1. University of Alabama, School of Dentistry
2. University of Southern California, School of Dentistry
3. College of Physicians and Surgeons, School of Dentistry
4. University of California, School of Dentistry
5. Georgetown University, School of Dentistry
6. Howard University, College of Dentistry
7. George Washington University, School of Medicine
8. University of Miami, School of Medicine
9. Emory University, Atlanta-Southern Dental College, School of Dentistry
10. Northwestern University, Dental School
11. Indiana University, School of Dentistry
12. State University of Iowa, College of Dentistry
13. University of Louisville, School of Dentistry and Medicine
14. Loyola University, School of Dentistry, New Orleans
15. University of Maryland, Baltimore College of Dental Surgery, The Dental School
16. Tufts University, School of Dental Medicine
17. Harvard School of Dental Medicine
18. University of Michigan, School of Dentistry
19. University of Minnesota, School of Dentistry
20. Kansas City-Western Dental College, School of Dentistry
21. Columbia University, School of Dental and Oral Surgery

22. New York University, College of Dentistry
23. New York Medical College—Flower and Fifth Avenue Hospitals
24. State University of New York, College of Medicine
25. University of Buffalo, School of Dentistry
26. Cornell University Medical College
27. University of Rochester, School of Medicine and Dentistry
28. Duke University, School of Medicine
29. University of Cincinnati, College of Medicine
30. Western Reserve University, School of Dentistry
31. The Ohio State University, College of Dentistry
32. University of Pennsylvania, Thomas W. Evans Museum and Dental Institute, School of Dentistry
33. University of Pennsylvania, School of Medicine
34. Temple University, School of Dentistry
35. University of Pittsburgh, School of Dentistry
36. Meharry Medical College, School of Dentistry
37. University of Texas, School of Dentistry
38. Medical College of Virginia, School of Dentistry
39. Marquette University, School of Dentistry
40. Albert Einstein College of Medicine of Yeshiva University
41. University of Oklahoma, School of Medicine
42. University of Tennessee, College of Dentistry
43. Loyola University, College of Dental Surgery, Chicago
44. University of Illinois, College of Dentistry
45. University of North Carolina, School of Dentistry
46. University of Washington, School of Dentistry
47. University of Chicago, The School of Medicine
48. University of Texas, Southwestern Medical School
49. Baylor University, College of Dentistry
50. Seton Hall University, Colleges of Dentistry and Medicine
51. University of Minnesota, Graduate School

Book Reviews

THE PRINCIPLES AND ART OF PLASTIC SURGERY

By Sir Harold Gillies, C.B.E., F.R.C.S., and D. Ralph Millard, Jr., M.D. First edition. Two volumes. $35. Boston, Little, Brown & Co., 1957.

These two volumes comprise a remarkable and unique treatise, presented almost as a novel, depicting the tragedy of wartime injuries and of congenital and acquired deformities in civilian life. Both volumes are well illustrated with adequate technical explanations of the many daring surgical procedures which promise many unfortunate individuals hope in the possibility of leading a useful life unhampered by crippling or repulsive deformities.

The authors report the results of a vast clinical experience which will guide practitioners in all branches of surgery. There is much information in both volumes to stimulate the interest of both oral surgeons and general dental practitioners.

It is difficult to select any one chapter as more outstanding than another. The manner of treating cleft palates could have elaborated on the present-day concept of correcting this deformity by means of speech appliances rather than by extensive multiple plastic surgical procedures.

James R. Cameron

DORLAND'S ILLUSTRATED MEDICAL DICTIONARY

Twenty-third edition. 1,598 pages with over 700 illustrations and 50 plates. Price $12.50. Philadelphia, W. B. Saunders Co., 1957.

In all previous editions, beginning in 1900, this was the *American Illustrated Medical Dictionary*, edited by W. A. Newman Dorland. Dr. Dorland died in September 1956 at the age of 92.

The present edition has an impressive editorial board, philological consultants, and a long list, equally impressive, of consultants and major contributors. Among the latter, and of particular importance to dentistry, are: Paul E. Boyle, dean and professor of dentistry, Western Reserve University; Maynard K. Hine, dean, School of Dentistry, Indiana University, assisted by nine members of his faculty, and Margaret Palmer, librarian, School of Dentistry, University of Pennsylvania. The American Dental Association is well represented by H. Trendley Dean, secretary, Council on Dental Research, Donald Washburn and George B. Denton (respectively, director and research consultant, Bureau of Library and Indexing Service). The name of Denton alone suggests, at least to this reviewer, that the dictionary is a commendable reference work.

New terms have been added and thousands of definitions have been rewritten to conform to newer knowledge. The page size has been increased to permit more entries per page, while keeping the volume to convenient size.

Added features of this edition are "Notes" on its use, and a table of "Modern Drugs and Dosage" by Austin Smith (editor, *Journal of the American Medical Association*). Students of dental nomenclature will find "The Fundamentals of Medical Etymology," by Lloyd W. Daly (associate professor of classical studies, University of Pennsylvania), helpful and scholarly.

If knowledge begets humility, then the publishers are modest indeed in their claims for a splendid contribution.

E. S. Khalifah

SCHOOL HEALTH AND HEALTH EDUCATION

By C. E. Turner; C. Morley Sellery, and Sara Louise Smith. Third edition. 466 pages. $4. St. Louis, C. V. Mosby Company, 1957.

School Health and Health Education was written for teachers and school health personnel in training and in service. The organization, methods and procedures in health education are adequately described. The authors show how physicians, nurses, dentists, dental hygienists, physical educators and other school personnel participate in the school health program.

Dental personnel will find this book helpful in reviewing current trends and in orienting their efforts to further dental health within the context of the school health program.

Among the topics included are: Whence School Health, School and Community Relations in Health Education, The School Health Team, Common Departures from

Health, School Health Services, The Promotion of Mental Health, Planning Health Instruction, Methods in Teaching Health, Resource Materials in Health Education, and Evaluation.

Two examples of the authors' alertness to late developments will interest dental health educators. Community organization for health education is described as "both desirable and inevitable." Also, they indicate their agreement with many authorities (including the Council on Dental Health of the American Dental Association) that "dental health of school children would not be improved by better case finding. What is needed is education in the values of dental service."

J. M. Wisan

SYNOPSIS OF PATHOLOGY

By W. A. D. Anderson, M.D. Fourth edition. 829 pages with 328 text illustrations and 12 color plates. Price $8.75. St. Louis, C. V. Mosby Co., 1957.

It is about five years since the third edition of this very useful volume was published. This revision adds approximately 40 pages and supplies nearly the same number of illustrations. These changes are evenly distributed and include alterations both in the text and the references cited at the end of each chapter. The book has all the advantages of the preceding editions; namely, brevity, authoritative treatment, excellent coverage and a logical arrangement; to these the revisions have contributed much.

The text is well written and easy to understand. The paper, printing and binding are of high quality. Again this volume on general pathology is strongly recommended for use where an abbreviated text may find a place.

Edward H. Hatton

PARODONTITES PYORRHÉIQUES, GINGIVITES SUPERFICIELLES ET PROFONDES (PERIODONTAL DISEASE, SUPERFICIAL AND PROFOUND GINGIVITIS)

By Eugene-Pierre Darcissac. 80 pages with 67 illustrations. Index. 1,000 French francs. Paris, Julien Prelat, 1956.

As indicated by the title, this book deals mainly with the different types of periodontal disease and gingivitis. Contents include a review of the literature, with special consideration of French and Swiss authors; a review of the anatomy of the periodontal region; an explanation of materials and methods used in France, and a presentation of several cases. The data are presented in detail, with adequate reproductions of roentgenograms, diagrams and charts.

In the prefatory remarks, the author makes clear that this manual is intended for preclinical dental students. The different types of the diseases are well presented. The clinical discussions are preceded by accounts of the main facts of pathologic anatomy and physiology and are followed by a brief prognostic and therapeutic summary. There are no bibliographies.

Although there are other works with similar titles, the book, well written and printed, could make an instructive summer reading for a dental student about to enter his clinical studies. It cannot be recommended, however, as a reference source for dental practitioners interested in recently developed treatment methods because the book lacks discussion of any sound etiologic background.

Paul H. Glucksman

WÖRTERBUCH DER MEDIZIN (MEDICAL DICTIONARY)

By Maxim Zetkin and Herbert Schaldach. 1,008 pages. Index. DM 16. Berlin, VEB Verlag Volk und Gesundheit, 1956.

This outstanding dictionary is not only a valuable textbook on etymology and the terminology of present-day German medicine and dentistry, but it is also an excellent reference work that should be useful to those interested in reading German dental or medical literature.

The introduction may serve as a guide to the pronunciation of the German terms. It gives the background necessary to acquaint the reader with the general problems of German nomenclature. The authors, with the aid of 54 specialists in medicine and dentistry, come closer to establishing the essential criteria for an outstanding medical dictionary than any one previously in Germany.

The book ends with a thorough discussion of the etymology of terms from Greek and Latin and a recommendation for standardizing some of these terms in international usage. This reference work is a "must" for all who are particularly interested in studying or translating German medical or dental textbooks.

The style of the authors is smooth and uncomplicated. Paper, typography and binding are of good quality.

John P. Herrick

Current Literature

PREVENTION OF DENTAL CARIES BY FLUORIDES. FLUORIDATION OF PUBLIC WATER SUPPLIES AND TOPICAL APPLICATION OF SODIUM FLUORIDE. (PROFILAXIA DA CÁRIE DENTARIA PELO FLÚOR. FLUORETAÇÃO DAS ÁGUAS DE ABASTECIMENTO PÚBLICO E APLICAÇÃO TÓPICA DE FLUORETO DE SÓDIO)

J. I. de Lima Teixeira. Rev. A. Paul. Cir. Dent. 10:205 July-Aug. 1956.

Petitions have been submitted to the local authorities of Pelotas, Rio Grande do Sul, Brazil, advocating the use of fluoride for the prevention of dental caries. Conditions which call for fluoridation of drinking waters in Pelotas include the following: (1) the high incidence of dental caries in the population (probably among the highest in the world); (2) the insufficient amount of fluoride in the drinking water, and (3) the distribution network of the drinking water which supplies a large part of the population. The benefits that will accrue to the population will far outweigh the cost of installing the systems and continuing fluoridation.

Topical application of a 2 per cent solution of sodium fluoride in distilled water was carried out by the author, according to Knutson's technic, on 28 girls 10 to 15 years old. After one year the dental examination showed that the incidence of caries in the teeth of the treated left quadrants was reduced by 74 per cent when compared with the teeth of the untreated right quadrants.

The most effective measure to prevent dental caries in Pelotas is to fluoridate the drinking waters. Topical applications of sodium fluoride should be carried out also when possible to prevent dental caries.

THE EFFECT OF DIET ON THE DEPOSITION OF GLYCOPROTEIN IN THE TEETH AND ITS RELATIONSHIP TO DENTAL CARIES IN THE SYRIAN HAMSTER

Jerome D. Buxbaum, Harris Kohn, Leah M. Proutt and Robert H. Oster. J.D.Res. 36:173 April 1957.

Recent histochemical and electron microscopic studies of enamel have revealed the presence of glycoprotein in the matrix. A study was undertaken to correlate dietary content of carbohydrate with the deposition of glycoprotein and to compare the amount of this deposition with the incidence of dental caries in the hamster.

Three generations of Syrian hamsters were maintained on sugar-rich, sugar-deficient and control diets for 100 days and then sacrificed. Their teeth were saved and examined for dental caries and then quantitatively analyzed for the presence of glycoprotein.

The caries scores were then correlated with the glycoprotein findings, and certain relations became apparent. Animals maintained on the low carbohydrate diet exhibited less caries than the animals maintained on the high carbohydrate diet, and also showed a lower glycoprotein content in the teeth.

Control animals also showed less caries and less glycoprotein than the sugar-rich group, but the control animals had slightly more caries and more glycoprotein than the sugar-deficient group.

These results indicate there is a positive relation between the presence of glycoprotein in the teeth and the incidence of dental caries and that the quantity of glycoprotein in the teeth varies with dietary factors prevailing during the time of tooth formation.

The laying down of glycoprotein apparently plays a significant role in the development of caries in the hamster.

MIXED TUMOR OF THE PALATE: REPORT OF A CASE

Noah R. Calhoun, Asa Yancey, Stanley Jackson, and William Bridgeford. J. Oral Surg. 15:159 April 1957.

Mixed tumors of the palate are relatively rare. When examined microscopically, a large number of these tumors show malignant characteristics, but when studied clinically show almost none. Mixed tumors seldom perforate the hard palate and when they are adequately removed, recurrence is rare.

On March 28, 1955, a negro man aged 34 years was admitted to the VA Hospital in Tuskegee, Ala., with a diagnosis of neoplasm of the palate. A similar mass had been removed from his palate in 1937, but it recurred in 1945. The recurrent mass had grown slowly until approximately one year prior to this admission when the rapidity of growth increased.

Examination of the oral cavity revealed a mass involving the hard and soft palates. The mass was approximately 5 cm. in diame-

ter, lobulated and attached primarily to the left side of the hard palate. The overlying mucosa was light pink with a brownish pigmentation of the anterior superior portion. Palpation revealed the mass to be soft and rubbery.

The roentgenographic examination showed an ill-defined area of decreased density in the hard palate which was thought to represent bone destruction. There was cloudiness of the left maxillary sinus. There was no roentgenographic evidence of metastasis. A tentative diagnosis was made of mixed tumor of palate, hemangioma of the palate. The biopsy report showed mixed tumor.

Under endotracheal anesthesia of thiopental sodium, nitrous oxide and oxygen, the tumor was excised en bloc, and the left maxillary sinus explored. The operation established a communication between the oral and nasal cavities and the left maxillary sinus. The remaining bone defect was packed lightly with a strip of iodoform gauze which was saturated with balsam of Peru. The dressing was held in place with a previously prepared acrylic resin splint. The neoplasm did not involve the left maxillary sinus.

The gauze strip was removed in sections over an eight day period, beginning five days postoperatively. An acrylic resin obturator with clasps and rests was constructed to cover the remaining defect of the palate. The microscopic findings were consistent with the diagnosis of mixed tumor.

ANTIHISTAMINIC THERAPY FOR GINGIVAL HYPERPLASIA DUE TO DILANTIN

R. A. Gaillard. New England J. Med. 256:76 Jan. 10, 1957.

Gingival hyperplasia is a common side reaction to diphenylhydantoin sodium therapy for epilepsy, being reported in from 50 per cent to over 60 per cent of patients so treated. Two patients with gingival hyperplasia resulting from prolonged diphenylhydantoin sodium therapy were treated with chlorprophenpyridamine maleate. The hyperplasia was eliminated without incident in both patients.

A 12 year old boy had been receiving diphenylhydantoin sodium for several years. His teeth were almost completely covered by his gingiva. He suffered from a secretory otitis media, with concurrent deafness and pronounced hypertrophy of the nasopharyngeal membranes. An allergic factor was suspected, and he was placed on antihistaminic therapy (12 mg. of chlorprophenpyridamine maleate in sustained-release capsule form twice a day). After two weeks the condition of the nasopharyngeal membranes and ears had improved greatly, and there was less hyperplasia of the gingiva. The therapy was continued for another two weeks, with continued gingival improvement. After two months of therapy the gingiva was nearly normal. Therapy was discontinued. After one month the gingiva again became hyperplastic. Antihistaminic therapy was reinstituted, with an attendant reduction of the hyperplasia.

A six year old boy with minimal gingival hyperplasia from diphenylhydantoin sodium was given 6 mg. of chlorprophenpyridamine maleate in sustained-release capsule form twice a day. His gums returned to normal within two weeks.

Various investigators have suggested that gingival hyperplasia due to diphenylhydantoin sodium therapy may be an exaggerated tissue response to injury in subjects with deranged adrenocortical function. Since antihistaminic agents affect the function of the adrenal gland, it is possible that antihistaminic therapy corrects or counteracts the derangement.

THE INCIDENCE OF SIX ANOMALIES OF THE TEETH AND JAWS

Meyer Klatsky. Human Biol. 28:420 Dec. 1956.

The anthropological division of the American Museum of Natural History is a repository of large collections of ancient and modern skulls suitable for the study of the incidence of dental anomalies. The incidence of six anomalies of the jaws and teeth were recorded, in an investigation of 8,328 skulls belonging to 25 geographically arranged groups.

Torus palatinus was found in 482 palates in 18 of these groups.

Torus mandibularis was found in 89 mandibles of 11 groups, mostly non-Europeans.

Supernumerary teeth totaled 41 in 14 groups.

Among all the 25 groups, 947 naturally missing teeth, mostly third molars, were recorded.

Reduced teeth, totaling 129, were found in 20 groups.

One hundred fifty-seven impacted teeth, mostly third molars and cuspids, were found in 19 groups, affecting both Europeans and non-Europeans.

Deaths

Abelson, Martin, Portland, Ore.; North Pacific College of Oregon, School of Dentistry, 1912; died March 28; aged 71.

Allen, Dane R., Madison, Tenn.; died January 30; aged 82.

Allen, Lyndon C., Kansas City, Mo.; New York College of Dentistry, 1885; died Feb. 17; aged 93.

Archbold, Roy, Decatur, Ind.; University of Michigan School of Dentistry, 1898; died March 24; aged 80.

Auld, Mark H., Kansas City, Mo.; Kansas City-Western Dental College, 1928; died Feb. 28; aged 60.

Axelrod, Leon, Brooklyn; New York College of Dentistry, 1920; died March 18; aged 74.

Baker, Bertram J., Mina, Nev.; University of Buffalo School of Dentistry, 1897; died March 14; aged 82.

Baker, Henry W., St. Paul; University of Minnesota School of Dentistry, 1905; died Jan. 16; aged 81.

Baker, Peter S., Somerville, Mass.; died March 8; aged 84.

Barnett, Alfred, Philadelphia; Temple University School of Dentistry, Philadelphia, 1932; died April 3; aged 48.

Baskin, Eldridge, Florence, S. C.; Baltimore College of Dental Surgery, University of Maryland, 1893; died March 23; aged 83.

Bauer, William H., St. Louis; St. Louis University School of Dentistry, 1943; died June 14; aged 69.

Bell, William, New York; New York University College of Dentistry, 1919; died March 16; aged 58.

Bentz, William C., Omaha; died March 10; aged 88.

Berman, Harry, Buffalo; University of Buffalo School of Dentistry, 1918; died March 9; aged 60.

Bevill, Robert L., Birmingham, Ala.; Birmingham Dental College, 1909; died March 9; aged 68.

Black, Dewitt T., Jr., Crossett, Ark.; University of Tennessee College of Dentistry, 1944; died March 16; aged 36.

Blazynski, Miecislaus J., Ocala, Fla.; Temple University School of Dentistry, Philadelphia, 1924; died Jan. 7; aged 56.

Boudreau, Frederick J., Philadelphia; Temple University School of Dentistry, Philadelphia, 1956; died Feb. 1957; aged 25.

Boydston, Walter J., Fairmont, W. Va.; University of Maryland Dental Department, Baltimore, 1900; died March 24; aged 80.

Brewitt, Joseph A., Tacoma, Wash.; North Pacific College of Oregon, School of Dentistry, Portland, 1912; died Jan. 24; aged 70.

Brown, Alexander, Phoenix, Ariz.; University of Southern California, School of Dentistry, Los Angeles, 1901; died March 14; aged 78.

Burke, David F., Manchester, Mass.; Harvard Dental School, Boston, 1912; died March 7; aged 71.

Bush, William P., Berkeley, Calif.; San Francisco Dental College, 1903; died Feb. 26; aged 82.

Byers, Harolde C., Muscatine, Iowa; University of Iowa College of Dentistry, 1910; died Nov. 1, 1956; aged 71.

Cahill, Adrian L., Silverton, Ohio; Cincinnati College of Dental Surgery, 1925; died March 25; aged 59.

Chattin, Robert A., Richmond, Ind.; Indiana Dental College, Indianapolis, 1908; died March 14; aged 82.

Church, Howard, Bethesda, Md.; University of Louisville School of Dentistry, 1924; died April 4; aged 62.

Clark, Emory J., Wisconsin Rapids, Wis.; Marquette University Dental School, Milwaukee, 1903; died March 19; aged 88.

Clark, John L., Valley Falls, R. I.; Tufts College Dental School, Boston, 1912; died March 12; aged 69.

Clarke, Edward G., Kenosha, Wis.; Chicago College of Dental Surgery, 1908; died Jan. 28; aged 68.

Clouser, Doyle W., Castle Rock, Colo.; University of Denver, School of Dentistry, 1925; died Feb. 8; aged 56.

Cohen, Gershon G., Jamaica, N. Y.; College of Dental and Oral Surgery, New York, 1919; died March 28; aged 59.

Cook, Frank W., Brooklyn; University of Buffalo School of Dentistry, 1899; died March 28; aged 85.

Courtemanche, Arthur B., Boston; University of Pennsylvania School of Dentistry, 1913; died March 20; aged 67.

Craig, Theodore H., Wallingford, Conn.; Baltimore College of Dental Surgery Dental School, University of Maryland, 1944; died Feb. 24; aged 39.

Dabney, M. G., Birmingham, Ala.; died March.

Davis, Aaron, Athens, Ohio; Ohio State University College of Dentistry, Columbus, 1945; died March 24; aged 52.

Dawson, Donald R., New Auburn, Wis.; Northwestern University Dental School, 1915; died Nov. 19, 1956; aged 69.

Dively, Benjamin F., Alexandria, Pa.; University of Pittsburgh School of Dentistry, 1927; died March 2; aged 53.

Doss, Louie M., Oklahoma City; Chicago College of Dental Surgery, 1906; died April 3; aged 77.

Drews, Edward H., Madison, Wis.; Northwestern University Dental School, 1902; died Feb. 24; aged 81.

Durkee, Clarence G., Hudson, N. Y.; College of Dental and Oral Surgery, New York, 1916; died Feb. 27; aged 69.

Dutton, Mark W., Hagerstown, Md.; University of Maryland Dental Department, Baltimore, 1915; died Feb. 27; aged 64.

Dye, Charles V., Marietta, Ohio; Ohio College of Dental Surgery, University of Cincinnati, 1896; died Jan. 30; aged 87.

Elliot, James L., Columbus, Ohio; Ohio State University College of Dentistry, Columbus, 1942; died March 19; aged 41.

Enright, George M., St. Louis; Washington University School of Dentistry, St. Louis, 1906; died March 6; aged 75.

Evans, James W., Clarendon, Texas; Washington University School of Dentistry, St. Louis, 1904; died Jan. 3; aged 88.

Fairbanks, John W., Youngstown, Ohio; Western Reserve University School of Dentistry, Cleveland, 1902; died March 11; aged 81.

Fish, James B., Buffalo; University of Buffalo School of Dentistry, 1903; died March 30; aged 76.

Fitzgerald, Charles W., Pawtucket, R. I.; Baltimore Medical College Dental Department, 1900; died March 8.

Flanery, Bayles K., Poplar Bluff, Mo.; University of Louisville School of Dentistry, 1919; died March 7; aged 67.

Folsom, William C., Nashville, Ga.; Atlanta-Southern Dental College, 1925; died Feb. 25; aged 53.

Ford, Harold B., Akron, Ohio; Starling-Ohio Medical College, Department of Dentistry, Columbus, 1909; died Dec. 19, 1956; aged 71.

Forman, Chester L., Highland Park, Mich.; Detroit College of Medicine, Department of Dental Surgery, 1908; died March 24; aged 71.

Foster, Harvey K., Greensboro, N. C.; Baltimore College of Dental Surgery Dental School, University of Maryland, 1914; died Feb. 22; aged 63.

Fox, Patrick L., Roslindale, Mass.; Tufts College Dental School, Boston, 1924; died March 26; aged 66.

Fried, Samuel J., New York; New York College of Dentistry, 1923; died March 25; aged 61.

Frost, Aubrey W., Boonville, Mo.; Washington University School of Dentistry, St. Louis, 1906; died March 1; aged 80.

Gardner, David S., Savannah, Tenn.; Vanderbilt University School of Dentistry, Nashville, 1907; died Jan. 15; aged 79.

Garlock, Emerald J., Lansing, Mich.; University of Michigan School of Dentistry, 1918; died March 21; aged 61.

Gaskins, Arthur A., Cambridge, Mass.; Howard University College of Dentistry, Washington, D. C., 1923; died Dec. 3, 1956; aged 68.

Gilkey, Rudolph L., Plainwell, Mich.; University of Michigan School of Dentistry, 1904; died March 12; aged 77.

Gilliland, Lloyd W., Pomona, Calif.; University of Southern California, School of Dentistry, Los Angeles, 1927; died March 6; aged 54.

Gordon, Sidney W., Cape Vincent, N. Y.; Philadelphia Dental College, 1892; died March 15; aged 88.

Graf, Julius J., St. Louis; Washington University School of Dentistry, St. Louis, 1903; died March 22; aged 74.

Guile, Beverly C., Elmira Heights, N. Y.; University of Buffalo School of Dentistry, 1897; died March 28; aged 85.

Hague, George H., Elizabeth, N. J.; Baltimore College of Dental Surgery Dental School, University of Maryland, 1905; died March 10; aged 78.

Harrington, Austin H., Johnstown, Pa.; University of Pittsburgh School of Dentistry, 1926; died Dec. 27, 1956; aged 56.

Harris, Vincent K., Muscatine, Iowa; University of Iowa, College of Dentistry, 1924; died Dec. 24, 1956; aged 62.

Hazlett, William A., Oswego, Kan.; Western Dental College, Kansas City, Mo., 1895; died March 4; aged 83.

Herzog, Eli H., Haverstraw, N. Y.; University of Pennsylvania School of Dentistry, Philadelphia, 1928; died March 21.

Horning, Stanley A., Mount Dora, Fla.; University of Michigan School of Dentistry, 1899; died Jan. 6; aged 81.

Horridge, Percy, Netcong, N. J.; University of Pennsylvania School of Dentistry, Philadelphia, 1915; died March 21; aged 62.

Hulse, Ray R., Keota, Iowa; University of Iowa College of Dentistry, 1911; died March 12; aged 68.

Isselhard, Roland M., Belleville, Ill.; Chicago College of Dental Surgery, 1917; died March 21; aged 60.

Joliet, Albert L., Canton, Ohio; Georgetown University School of Dentistry, Washington, D. C., 1907; died March 27; aged 72.

Jones, Edward F., Yonkers, N. Y.; University of Pennsylvania School of Dentistry, 1917; died Jan. 26; aged 61.

Kaplan, Edward, Uniontown, Pa.; University of Pittsburgh School of Dentistry, 1923; died March 3; aged 57.

Keith, Robert P., Chicago; Northwestern University Dental School, 1900; died Jan. 25; aged 79.

King, Thomas J., Lynchburg, Va.; Medical College of Virginia Dental Department, Richmond, 1913; died March 7; aged 70.

Kotovic, Joseph J., Riverside, Ill.; Loyola University School of Dentistry, Chicago College of Dental Surgery, 1927; died Jan. 16; aged 53.

Kustermann, Louis C., Chicago; Marquette University Dental School, Milwaukee, 1912; died March 19; aged 67.

Kyriak, Michael H., Chicago; Chicago College of Dental Surgery, 1912; died Jan. 26; aged 74.

Lefebvre, Edward J., DePere, Wis.; Marquette University Dental School, 1931; died Oct. 20, 1956; aged 49.

Lemon, George B., Salinas, Calif.; College of Physicians and Surgeons, San Francisco, 1917; died Feb. 24; aged 66.

Likens, Basil E., Akron, Ohio; died Jan. 18; aged 50.

Long, Olive R., Williamsville, N. Y.; University of Buffalo School of Dentistry, 1911; died March 15.

Lowe, James A., Foxworth, Miss.; University of Tennessee College of Dentistry, 1925; died Dec. 25, 1956; aged 64.

Luckinbill, Frank H., St. Joseph, Mo.; Kansas City Dental College, 1917; died Feb. 28; aged 70.

Mack, Harry W., Detroit; University of Michigan School of Dentistry, 1913; died March 3; aged 64.

Maddock, William I., Paris, Ill.; Northwestern University Dental School, 1899; died March 10; aged 89.

Mathae, George H., St. Louis; Marion-Sims Dental College, St. Louis, 1900; died Sept. 22, 1956; aged 75.

Maxwell, Joseph H., Gray Summit, Mo.; Marion-Sims Dental College, St. Louis, 1905; died Jan. 11, 1956; aged 75.

McMillan, Tommy H., Homestead A.F.B., Fla.; University of Tennessee College of Dentistry, 1954; died Dec. 4, 1956; aged 30.

Neumuller, Ernest J., Wilkes Barre, Pa.; University of Pennsylvania School of Dentistry, Philadelphia, 1908; died Jan. 30; aged 76.

Niles, Harry A., Binghamton, N. Y.; Baltimore College of Dental Surgery, University of Maryland, 1916; died March 2; aged 65.

Northen, William L., Sarasota, Fla.; Atlanta Dental College, 1905; died March 6; aged 75.

Ogle, Willard, Dallas, Texas; Vanderbilt University School of Dentistry, 1912; died April 11; aged 67.

Okun, Samuel B., Jamaica, N. Y.; Columbia University School of Dental and Oral Surgery, New York, 1924; died March 4; aged 57.

Olson, Alfred, Minneapolis; University of Minnesota School of Dentistry, Minneapolis, 1917; died Feb. 25; aged 65.

Parks, McCurry M., Valdosta, Ga.; Atlanta-Southern Dental College, Atlanta, 1918; died Jan. 20; aged 64.

Peck, Chester K., Calmar, Iowa; University of Iowa College of Dentistry, 1922; died Dec. 3, 1956; aged 56.

Porter, Charles E., Chattanooga, Tenn.; Vanderbilt University School of Dentistry, Nashville, 1917; died March 7; aged 62.

Proctor, Gerald F., Philadelphia; University of Pennsylvania School of Dentistry, Philadelphia, 1911; died March 22; aged 69.

Ramsay, Rosser B., Atlanta, Ga.; Atlanta-Southern Dental College, 1926; died March 22; aged 55.

Redding, William A., Crystal Springs, Miss.; Vanderbilt University School of Dentistry, Nashville, 1926; died Jan. 9; aged 52.

Reichel, William, Annapolis, Md.; Baltimore College of Dental Surgery, University of Maryland, 1922; died April 25, 1956; aged 57.

Reigelman, Leon J., Traverse City, Mich.; University of Michigan College of Dentistry, 1923; died December 17, 1956; aged 60.

Reisner, Irving, New York; College of Dental and Oral Surgery, New York, 1919; died January 13; aged 58.

Reisner, Leon, Long Branch, N. J.; University of Pennsylvania School of Dentistry, 1913; died February 21; aged 68.

Reynolds, Jotham G., Wolcott, Conn.; died Nov. 15, 1956; aged 71.

Richards, Harry L., Rockland, Me.; Philadelphia Dental College, 1901; died March 8; aged 78.

Richardson, Benjamin A., Indianapolis; Pennsylvania College of Dental Surgery, Philadelphia, 1899; died February 6; aged 80.

Ries, William J., Greenville, Miss.; University of Tennessee College of Dentistry, 1934; died February 21; aged 49.

Rigsbee, Marvin W., Anderson, Ind.; Indiana University School of Dentistry, Indianapolis, 1929; died March 23; aged 53.

Roberts, John B., Columbus, Ga.; Atlanta Dental College, 1908; died February 19; aged 68.

Robison, Homer B., Hutchinson, Kan.; Western Dental College, Kansas City, 1907; died February 11; aged 75.

Rothschild, Walter A., Madison, S. D.; Chicago College of Dental Surgery, Loyola University, 1895; died October 11, 1956; aged 84.

Roush, Ralph R., Columbus, Ohio; Ohio State University College of Dentistry, 1915; died January 31; aged 67.

Russell, Lamar, Jackson, Miss.; Atlanta-Southern Dental College, 1929; died January 29; aged 50.

Sadoff, Louis, New York; New York College of Dentistry, 1913; died March 10; aged 67.

Sealove, Nathaniel I., Tucson, Ariz.; University of Pennsylvania School of Dentistry, 1929; died February 8; aged 50.

Singer, John G., Glen Rock, N. J.; University of Pennsylvania School of Dentistry, 1902; died February 21; aged 78.

Sizer, Louis J., Battle Creek, Mich.; Chicago College of Dental Surgery, Loyola University, 1897; died December 7, 1956; aged 83.

Small, Wilbert M., Boston; Tufts University School of Dental Medicine, 1917; died February 6; aged 74.

Smith, Russell O. L., East Aurora, N. Y.; University of Buffalo School of Dentistry, 1918; died December 8, 1956; aged 61.

Southard, Ted R., Manistique, Mich.; University of Michigan College of Dental Surgery, 1916; died February 20; aged 72.

Spare, Horace I., Berkeley, Calif.; University of California College of Dentistry, 1915; died March 2.

Sprafka, John F., Pasadena, Calif.; University of Minnesota College of Dentistry, 1920; died February 11; aged 59.

Stansbury, George H., Joliet, Ill.; Northwestern University Dental School, 1917; died December 11, 1956; aged 63.

Stephens, Floyd L., Memphis, Tenn.; died November 9, 1956; aged 64.

Stern, Monroe, Flushing, L. I., New York; New York College of Dentistry, 1921; died February 6; aged 60.

Stewart, Guy A., New York; New York Dental School, 1900; died January 15; aged 79.

Strickland, Henry T., Jackson, Ga.; Atlanta-Southern Dental College, 1919; died February 14.

Swaab, Louis R., Toledo, Ohio; University of Michigan College of Dental Surgery, 1924; died January 11; aged 54.

Sweeney, Edward F., Bayonne, N. J.; College of Dental and Oral Surgery, New York, 1921; died March 1; aged 57.

Taggart, Ethel E., Freeport, Ill.; Northwestern University Dental School, 1921; died February 17; aged 68.

Tate, Walla, Thompsonville, Ill.; died December 25, 1956.

Taylor, Victor S., Huntington Park, Calif.; Ohio College of Dental Surgery, University of Cincinnati, 1905; died February 10; aged 74.

Thomas, Howell A., Aransas Pass, Texas; Baylor University College of Dentistry, 1927; died February 5; aged 54.

Thompson, Walter C., Lexington, Mass.; Boston Dental College, 1896; died January 4, 1956; aged 81.

Torosian, Martin H., Asbury Park, N. J.; Lincoln Dental College of Cotner University, 1905; died March 2; aged 79.

Tyler, Jesse M., Tuscaloosa, Ala.; Northwestern University Dental School, 1911; died February 19; aged 71.

Vores, Victor A., New Milford, Conn.; University of Pennsylvania School of Dentistry, 1900; died January 26; aged 78.

Walker, Andrew B., Norman, Okla.; Chicago College of Dental Surgery, Loyola University, 1902; died November 20, 1956; aged 79.

Walker, Frank M., Indianapolis; Indiana University School of Dentistry, 1925; died February 23; aged 56.

Warne, Robert M., Newton Square, Pa.; University of Pennsylvania School of Dentistry, 1943; died February 7; aged 40.

Weaver, Harry D., South Bend, Ind.; Chicago College of Dental Surgery, Loyola University, 1916; died November 14, 1956; aged 63.

Weinmann, Isadore, Newark, N. J.; New York College of Dentistry, 1922; died February 17; aged 57.

Weinzweig, Morris H., Brooklyn; University of Buffalo School of Dentistry, 1925; died February 4; aged 65.

West, Sylvan E., San Francisco, Calif.; University of California College of Dentistry, 1918; died February 14; aged 61.

Wiggins, Edward D., Chicago; University of Illinois College of Dentistry, 1931; died July 5, 1956; aged 58.

Willis, Linford R., Des Moines, Iowa; Howard University College of Dentistry, 1910; died February 24; aged 77.

Wood, Edmund N., Birmingham, Ala.; Birmingham Dental College, 1902; died February 7; aged 78.

Yost, William F., Little Rock, Ark.; University of Tennessee College of Dentistry, 1940; died March 3; aged 45.

Zales, Joseph Edward, Corona, Calif.; University of California College of Dentistry, 1919; died December 22, 1956; aged 68.

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THE JOURNAL OF THE AMERICAN DENTAL ASSOCIATION
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All expressions of opinion and all statements of supposed fact are published on the authority of the writer over whose signature they appear and are not to be regarded as expressing the views of the American Dental Association, unless such statements or opinions have been adopted by the Association. Articles are accepted with the understanding that they have not been published previously and that they are submitted solely to The Journal. The Journal of the American Dental Association is indexed in the Index to Dental Literature, in the Current List of Medical Literature and, in part, in the Quarterly Cumulative Index Medicus, Biological Abstracts and Chemical Abstracts.

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Announcements

MEETINGS OF THE AMERICAN DENTAL ASSOCIATION

Ninety-Eighth Annual Session	Nov. 4-7, 1957	Miami, Fla.
Ninety-Ninth Annual Session	Nov. 10-13, 1958	Dallas, Texas
One-Hundredth Annual Session	Sept. 21-24, 1959	New York
One-Hundred and First Annual Session	Oct. 17-20, 1960	Los Angeles
One-Hundred and Second Annual Session	Oct. 16-19, 1961	Philadelphia

MEETINGS OF CONSTITUENT SOCIETIES

State	Date	Place	Secretary	Address
Alabama	Apr. 24-26, 1958	Montgomery	C. R. Crook	Professional Center, Montgomery
Alaska			C. L. Polley	Box 1896, Juneau
Arizona	Apr. 16-19, 1958	Tucson	W. G. Burke	17 E. Weldon Ave., Phoenix
Arkansas	Apr. 13-16, 1958	Little Rock	D. M. Hamm	Box 89, Clarksville
California	Apr. 20-23, 1958	San Francisco	W. J. Healy	450 Sutter St., San Francisco
S. California	Apr. 14-16, 1958	Los Angeles	S. M. Silverman	903 Crenshaw Blvd., Los Angeles 19
Colorado	Oct. 6-9	Colorado Springs	G. H. Jackson	724 Republic Bldg., Denver
Connecticut	May 14, 15, 1958	Hartford	E. S. Arnold	37 Linnard Rd., W. Hartford
Delaware			A. G. Schiek	3716 Philadelphia Pike, Claymont
District of Columbia	Mar. 9-12, 1958	Washington	J. F. Keaveny	1029 Vermont Ave., N.W., Washington
Florida	May 18-21, 1958	Miami Beach	G. J. Perdigon	17 Davis Blvd., Tampa
Georgia	Sept. 29-Oct. 2	Atlanta	J. W. Yarbrough	Southern United Bldg., Macon
Hawaii			J. H. Dawe	810 N. Vineyard St., Honolulu
Idaho	May 1958	Boise	G. L. Williamson	1003½ Main St., Boise
Illinois	May 11-14, 1958	Springfield	P. W. Clopper	632 Jefferson Bldg., Peoria
Indiana	May 19-21, 1958	Indianapolis	W. R. Shoemaker	Citizens Bank Bldg., Anderson
Iowa	May 5-7, 1958	Des Moines	H. I. Wilson	Insurance Exchange Bldg., Des Moines
Kansas	May 5-8, 1958	Kansas City, Mo.	F. A. Richmond	Brotherhood Bldg., Kansas City 1
Kentucky	Mar. 23-26, 1958	Louisville	A. B. Coxwell, Jr.	2208 Dundee Rd., Louisville 5
Louisiana	Apr. 9-12, 1958	Monroe	J. S. Bernhard	2515 Line Ave., Shreveport
Maine			S. M. Gower	Box 27, Skowhegan
Maryland	May 4-7, 1958	Baltimore	C. L. Inman, Jr.	Medical Arts Bldg., Baltimore
Massachusetts	May 4-7, 1958	Boston	H. E. Tingley	12 Bay State Rd., Boston 15
Michigan	Apr. 28-30, 1958	Detroit	F. Wertheimer	Michigan Dept. of Health, Lansing
Minnesota	Apr. 14-16, 1958	St. Paul	C. V. E. Cassel	2236 Marshall Ave., St. Paul 4
Mississippi	June 9-11, 1958	Biloxi	B. A. Cohen	500-E E. Woodrow Wilson Dr., Jackson 27
Missouri	May 4-7, 1958	Kansas City	E. D. Suggett	Merchants Bank Bldg., Jefferson City
Montana	May 1-3, 1958	Butte	R. C. Ritter	28 N. Black St., Bozeman, Mont.
Nebraska	Apr. 28-30, 1958	Omaha	F. A. Pierson	Federal Securities Bldg., Lincoln
Nevada	June 1958	Reno	O. M. Seifert	755 Ryland Ave., Reno
New Hampshire			F. E. Williams	814 Elm St., Manchester
New Jersey	May 11-15, 1958	Atlantic City	J. G. Carr	407 Cooper St., Camden
New Mexico	May 25-28, 1958		J. S. Eilar	7 Medical Arts Sq., N.E., Albuquerque
New York	May 12-14, 1958	Buffalo	C. A. Wilkie	1 Hanson Pl., Brooklyn 17
North Carolina	May 4-7, 1958	Pinehurst	L. H. Butler	Jefferson Bldg., Greensboro

State	Date	Place	Secretary	Address
North Dakota	May 4-7, 1958	Bismarck	J. H. Pfister	419½ Dakota Ave., Wahpeton
Ohio	Oct. 6-9	Columbus	E. G. Jones	185 E. State St., Columbus
Oklahoma	Apr. 20-23, 1958	Oklahoma City	L. D. Wright	Osler Bldg., Oklahoma City
Oregon	Mar. 3-5, 1958	Portland	T. D. Holder	Selling Bldg., Portland
Panama Canal Zone	Apr. 1958	Ancon	W. R. Bond, Jr.	Ft. Kobbe Dental Clinic, Ft. Kobbe
Pennsylvania	May 21-23, 1958	Harrisburg	M. D. Zimmerman	217 State St., Harrisburg
Puerto Rico	January 1958		R. Borges	Box 843, Arecibo
Rhode Island	Jan. 28, 29, 1958	Providence	W. F. Decesare	216 Broadway, Providence
South Carolina	May 11-13, 1958	Myrtle Beach	J. E. Wallace	1420 Gregg St., Columbia
South Dakota	May 11-13, 1958	Mitchell	R. E. Decker	Box 308, Parker
Tennessee	May 12-15, 1958	Chattanooga	K. P. Ezell	116 N. Academy, Murfreesboro
Texas	May 3-6, 1959	San Antonio		3707 Gaston Ave., Dallas 10
Utah	May 22-24, 1958	Salt Lake City	R. C. Dalgleish	State Capitol Bldg., Salt Lake City
Vermont	May 25-27, 1958	Manchester	E. H. Van Santvoord	22 Washington St., Rutland
Virginia	May 4-7, 1958	Richmond	W. T. McAfee	Colonial National Bank Bldg., Roanoke
Washington	Mar. 24-26, 1958	Seattle	W. P. Brust	Medical Center, Everett
West Virginia			G. N. Casto, Jr.	710½ Lee St., Charleston
Wisconsin	Apr. 21-23, 1958	Milwaukee	H. O. Hoppe	1331 W. Vliet St., Milwaukee
Wyoming	June 12-14, 1958	Casper	T. J. Drew	State Office Bldg., Cheyenne

MEETINGS OF STATE BOARDS OF DENTAL EXAMINERS

State	Date	Place	Secretary	Address
Alabama			W. L. McCarty	Professional Center, Montgomery
Alaska			R. H. Williams†	Box 2122, Juneau
Arizona			W. G. Biddulph	1502 W. Osborn Rd., Phoenix
Arkansas			W. T. Jones	107 E. Shelton, Monticello
California			D. R. Grant	507 Polk St., San Francisco
Colorado			R. F. Gilmore	Republic Bldg., Denver 2
Connecticut			C. G. Brooks	302 State St., New London
Delaware			P. K. Musselman	143 W. Main St., Newark
District of Columbia	Jan. 6-10, 1958	Washington	W. T. Birthright	1835 Eye St., N.W., Washington
Florida			R. P. Taylor, Jr.	P. O. Box 2913, Jacksonville 3
Georgia	June 9-11, 1958	Atlanta	W. G. Brown	Blackshear
Hawaii	Aug. 29-Sept. 2*†	Honolulu	J. Y. Ing	210 James Campbell Bldg., Honolulu
Idaho			A. G. DeWinter	Sun Bldg., Boise
Illinois			W. A. McKee	Wood Bldg., Benton
Indiana	Dec. 2-5*†	Indianapolis	C. A. Frech	Gary National Bank Bldg., Gary
Iowa			P. A. Hahn	Farmers & Merchants Bank Bldg., Burlington
Kansas			G. L. Teall	Box 71, Hiawatha
Kentucky			J. J. Kelly	102 W. Madison St., Franklin
Louisiana			R. C. Steib	Maison Blanche Bldg., New Orleans
Maine			A. S. Appleby	Box 260, Skowhegan
Maryland	Nov. 18-20‡		W. D. Burton	829 Park Ave., Baltimore 1
Massachusetts			A. M. Bommer	349 Broadway, Revere
Michigan			J. L. Champagne	3714 W. McNichols Rd., Detroit 21
Minnesota			M. G. Walls	Lowry Bldg., St. Paul
Mississippi			J. C. Boswell	Medical Arts Bldg., Jackson
Missouri			R. R. Rhoades	Central Trust Bldg., Jefferson City
Montana			R. O. Betzner	303 Power Block, Helena
Nebraska			H. E. Weber	Stuart Bldg., Lincoln
Nevada			A. A. Cozzalio	130 N. Virginia, Reno
New Hampshire	June 19,20* June 19,†	Boston	S. G. Markos	8 Renaud Ave., Dover
New Jersey	1958		C. J. Schweikhardt	150 E. State St., Trenton 8
New Mexico			J. J. Clarke, Sr.	Artesia

State	Date	Place	Secretary	Address
New York	Dec. 10-13*‡		D. W. Beier	23 S. Pearl St., Albany 7
North Carolina			J. H. Guion†	Doctors Bldg., Charlotte 7
North Dakota			T. M. Flath	312 Main St., Williston
Ohio			D. E. Bower	320 Ontario St., Toledo 2
Oklahoma			W. E. Cole	2420 N. Meridian, Oklahoma City
Oregon			F. L. Utter	Pioneer Trust Bldg., Salem
Pennsylvania			R. E. V. Miller, Sr.	Dept. of Public Instruction, Box 911, Harrisburg
Puerto Rico			J. Mercado C.	Comercio St. #452, San Juan
Rhode Island			F. M. Hackett	267 Academy Ave., Providence
South Carolina			J. L. Gunter	1226 Pickens St., Columbia 1
South Dakota			H. T. Aker	Canton
Tennessee			C. R. Aita	Bennie-Dillon Bldg., Nashville
Texas			R. T. Weber	Capitol National Bank Bldg., Austin 16
Utah			A. Ridge, Jr.	10 S. Second E., Provo
Vermont			P. M. Fitch	Newport
Virginia			J. M. Hughes	Medical Arts Bldg., Richmond
Washington			F. S. Rotchford	1108 S. Washington St., Olympia
West Virginia			C. C. Cottrill	Box 111, Glen Rogers
Wisconsin			S. F. Donovan	Tomah
Wyoming			W. A. Hocker	O & S Bldg., Casper

Most states require applications to be in 30 days prior to examination date.
*Dental examination. †Dental hygiene examination. ‡Write to secretary of dental examining board for information on locations of examinations.

MEETINGS OF OTHER ORGANIZATIONS

Name	Date	Place	Secy. or Chm.	Address
American Academy of Crown and Bridge Prosthodontics	Feb. 1-2, 1958	Chicago	C. E. Brooks Secy.	4500 Olive St., St. Louis 8
American Academy of Gold Foil Operators	Nov. 1, 2	New Orleans	R. B. Wolcott Secy.	Navy Dental Tech. School, Naval Training Center, San Diego, Calif.
American Academy of Implant Dentures	Nov. 2-4	Miami, Fla.	P. S. Loechler Secy.	340 N. California, Stockton, Calif.
American Academy of Oral Roentgenology	Nov. 1, 2	Miami Beach, Fla.	H. M. Berry, Jr. Secy.	4001 Spruce St., Philadelphia 4
American Academy of Periodontology	Oct. 31-Nov. 2	Miami, Fla.	C. E. Chamberlain Secy.	1101 N. North St., Peoria, Ill.
American Association of Dental Examiners	Nov. 1, 2		C. A. Bumstead Secy.	Stuart Bldg., Lincoln, Neb.
American Association of Endodontists	Jan. 31-Feb. 2, 1958	Chicago	V. B. Milas Secy.	2559 W. 63rd St., Chicago 29
American Board of Oral Pathology	Dec. 7, 8		D. A. Kerr Secy.	University of Michigan, School of Dentistry, Ann Arbor, Mich.
American College of Dentists	Nov. 3	Miami Beach, Fla.	O. W. Brandhorst Secy.	4221 Lindell Blvd., St. Louis 8
American Dental Assistants Association	Nov. 4-7	Miami Beach, Fla.	M. L. Martin Exec. Secy.	First National Bank Bldg., LaPorte, Ind.
American Dental Hygienists' Association	Nov. 4-7	Miami Beach, Fla.	M. E. Swanson Exec. Secy.	1735 Eye St., N.W., Washington 6, D.C.
American Dental Society of Anesthesiology	Nov. 2, 3	Miami, Fla.	A. J. Follenius Secy.	73 New York Pl., Staten Island 14, N.Y.
American Dental Society of Europe	Aug. 28-31	Lausanne, Switzerland	J. P. Molony Secy.	110 Harley St., London W. 1, England
American Denture Society	Nov. 1-3	Miami Beach, Fla.	V. L. Steffel Secy.	College of Dentistry, Ohio State University, Columbus, Ohio
American Equilibration Society	Jan. 30, 1958	Chicago	W. W. Hurst Secy.	820 S. Damen Ave., Chicago 12
American Institute of Dental Medicine	Oct. 13-17	Palm Springs, Calif.	M. G. Lewis Exec. Secy.	2240 Channing Way, Berkeley 4, Calif.
American Public Health Association	Nov. 11-15	Cleveland	R. M. Atwater Exec. Secy.	1790 Broadway, New York 19

Name	Date	Place	Secy. or Chm.	Address
American Society for the Advancement of General Anesthesia in Dentistry	Oct. 28	New York	M. H. Feldman Exec. Secy.	730 Fifth Ave., New York, 19
American Society of Dentistry for Children	Nov. 1-3	Miami, Fla.	W. E. Brown Secy.	705 N. University Ave., Ann Arbor, Mich.
American Society of Oral Surgeons	Oct. 30-Nov. 2	Miami Beach, Fla.	A. B. Coxwell Exec. Secy.	2208 Dundee Rd., Louisville 5, Ky.
Asociacion Odontologica Argentina, Thirteenth Jornadas	Oct. 14-17	Buenos Aires	J. M. Lueje Secy.	959 Junin, Buenos Aires, Argentina
Chicago Dental Society	Feb. 2-5, 1958	Chicago	K. S. Richardson Exec. Secy.	30 N. Michigan Ave., Chicago
Council on Dental Education, Dental Aptitude Tests	Oct. 4, 5		S. Peterson Secy.	222 E. Superior St., Chicago
Denver Dental Association	Jan. 5-8, 1958	Denver	E. T. Klein Secy.	Republic Bldg., Denver 2
European Orthodontological Society	Aug. 29-Sept. 2	Geneva, Switzerland	E. Fernex	1 Place du Port, Geneva, Switzerland
Federation Dentaire Internationale 45th Annual Meeting	Sept. 6-14	Rome, Italy	G. H. Leatherman Secy. Gen.	35, Devonshire Pl., London W. 1., England
Fifteenth Congres Francais de Stomatologie	Sept.	Paris, France	J. Bara Gen. Secy.	30, Ave. Felix Faure, Paris 15, France
Greater New York Dental Meeting	Dec. 9-13	New York	I. Teich Secy.	Hotel Statler, New York, 1
Mexican Dental Association, Fourth Congress	Nov. 10-14	Mexico City	E. Martinez R. Secy.	Sinaloa 9, Mexico, D.F.
Mid-Continent Dental Congress	Nov. 17-20	St. Louis	J. E. Brophy Exec. Secy.	8013 Maryland Ave., St. Louis 5
National Board of Dental Examiners	Dec. 2, 3		G. J. Casey Secy.	222 E. Superior St., Chicago
National Dental Association	Aug. 4-8	Hot Springs, Ark.	J. A. Jackson Secy.	P.O. Box 197, Charlottesville, Va.
New England Dental Society	Oct. 16, 17	Boston	F. L. Finley, Jr. Secy.	43 Farmington Ave., Hartford, Conn.
New Orleans Dental Conference	Nov. 10-14	New Orleans	E. Burvant Secy.	Maison Blanche Bldg., New Orleans
Northeastern Society of Orthodontists	Oct. 21, 22	Buffalo	D. Mossberg Secy.	36 Central Park S., New York
Norwegian Dental Association, Annual Meeting	Oct.	Oslo, Norway	K. Gard Secy.	Incognitogatan 17, Oslo, Norway
Odontologica Federation of Central America and Panama	Sept. 11-14	Guatemala, C.A.	A. Hurtarte E. Secy.	4a Avenida No. 12-47, Zona 1, Guatemala, C.A.
Osterreichische Zahnarztetagung	Oct.	Krems/Niederosterreich, Austria	H. Kränzl	25a Währingerstrasse, Vienna 9, Austria
Pacific Coast Dental Conference	Aug. 19-22	San Diego	C. W. Gilman Secy.	219 E. 8th St., National City, Calif.
Pacific Coast Society of Prosthodontists	Aug. 15-17	San Diego	A. W. Spaulding Secy.	4350 11th Ave., Los Angeles 8
Thirty-First Journees Dentaires Internationales de Paris	Nov. 25-Dec. 1	Paris, France	R. Ibos	14 Ave. Gabriel-Peri, Antony, Seine, France
Twelfth International Dental Congress	Sept. 7-14	Rome, Italy	P. Lalli Secy. Gen.	Via Boezio 16, Rome, Italy
Uruguayan Dental Society, Fourth International Meeting	Nov. 20-22		H. Sacchi	Vazquez 1414, P.5, Montevideo, Uruguay

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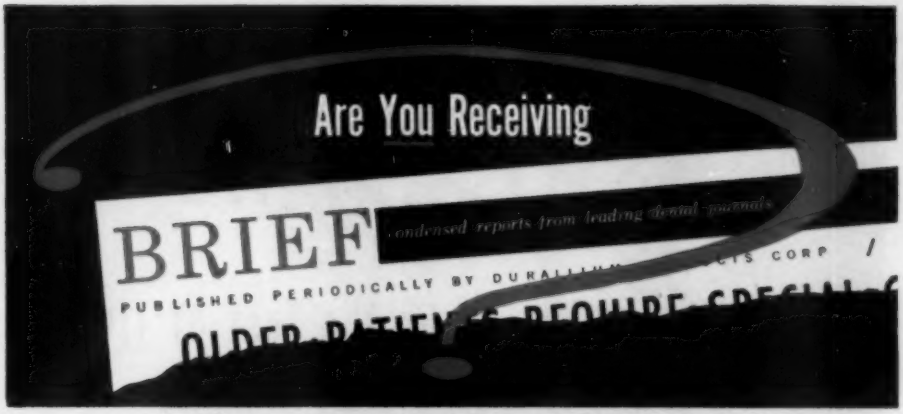

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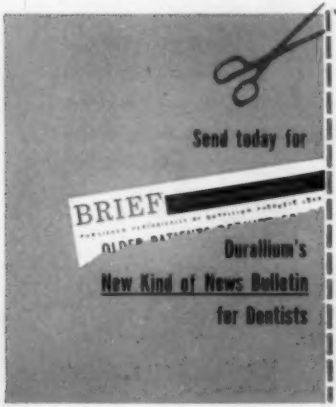

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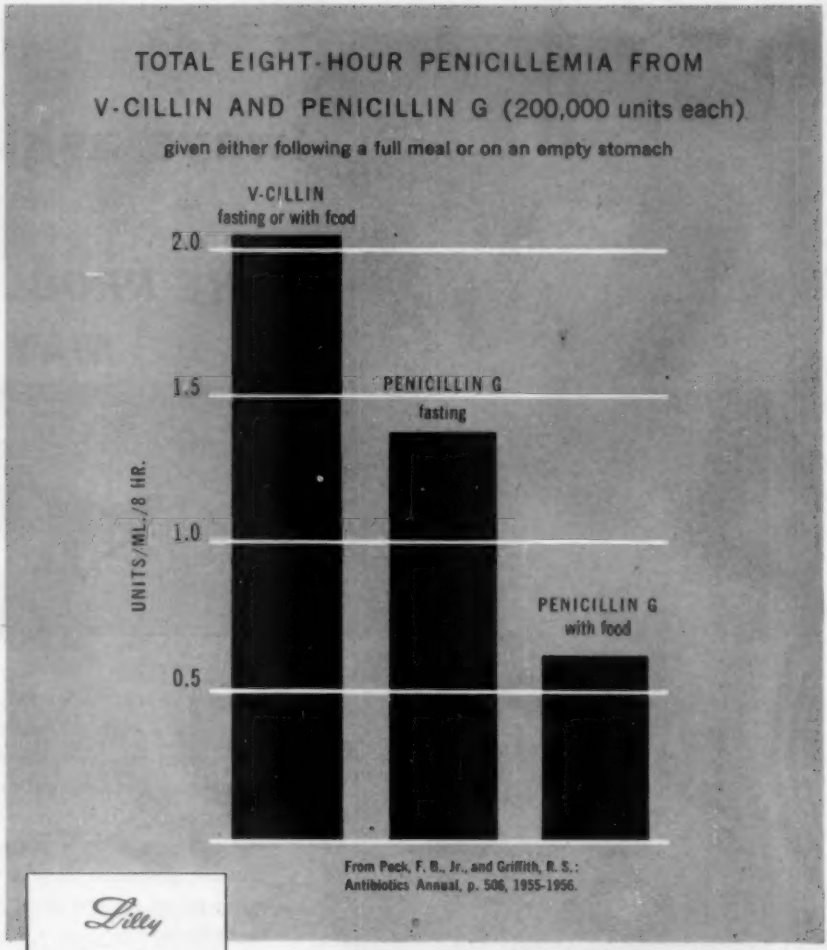

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DENTAL X-RAY NEWS

No. 10

HANDY TWINPACK SPEEDS DARKROOM WORK

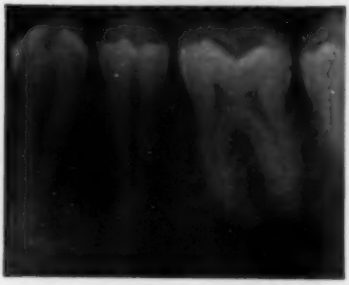
To help dental office personnel mix x-ray processing solutions accurately and fast, Du Pont supplies the convenient Twinpack of Dental X-ray Developer and Fixer, formulated specially for dental x-ray processing. The concentrated liquids come in 24-ounce bottles, each making a full gallon of solution.

Packed together in a single carton, the developer and fixer are easy to store, always right at hand, ready to use in the darkroom. And to simplify mixing small quantities, the bottles are conveniently marked in one-ounce gradations.

There are four fine Du Pont Dental X-ray Films available, too . . . Bitewing Film for interproximal examination and three periapical films: medium speed "S," fast "D," and very high speed Lightning Fast, offering a range wide enough to meet any x-ray problem. All Du Pont Films are packaged in the easy-to-open "Pull-A-Tab" packet for your convenience.

Specify Du Pont Dental X-ray Films and Chemicals when you order. Your dealer will be glad to show you our complete line of dental x-ray products. Du Pont Photo Products Dept., Nemours Building, Wilmington 98, Delaware. In Canada, Du Pont Company of Canada (1956) Limited, Toronto.

HOW TO AVOID POOR RADIOGRAPHS WITH PROPER PROCESSING



This radiograph was fogged by processing in developer that was allowed to get too warm and has lost much of its diagnostic value.

During the hot summer months the temperature of the incoming faucet water rises. This makes it more difficult to control the temperature of the processing solutions and it's harder to hold them at the recommended 68° F.

When the temperature of the developer rises as high as 80° F, it is virtually impossible to avoid chemical fog on films. A simple step to ease this problem is to add additional *restrainer* to the developer. Adding 2½ ounces of sodium bicarbonate for each gallon of tank capacity alters the time-temperature ratio of Du Pont Dental X-ray Developer and permits increased developing times at high temperatures. For instance, with the restrainer added, you can get good results with a temperature of 75° F by developing film for 4½ minutes.

Summer or winter, remember there's no substitute for careful checking and rechecking every step in the darkroom. That's the easiest way to get consistently good results.

DU PONT

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. . . *THROUGH CHEMISTRY*

Mandibular neoplasm? Or infection?
The occlusal radiograph provides information, guides treatment.

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As a famous teacher told his students: "The burden is upon you. It is your responsibility to find the answer."

That's why it is necessary to make all the radiographs needed for a thorough knowledge of each case . . . First, a complete periapical examination, for record and basic understanding, then occlusal and extraoral radiographs as required by the individual case. However, it is not enough merely to make sufficient radiographs. *Each radiograph must be of such quality that it will yield its complete quota of information.*

That is why it is wise to use Kodak x-ray materials always. They are made to work together—made to produce dependable results.

NOW TWICE AS FAST! SAME HIGH QUALITY!

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...and identify"

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Use Kodak Dental X-ray Film

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San Francisco 3, California

School of Dentistry
University of California
University Medical Center
San Francisco 22, California

School of Dentistry
University of Southern California
925 West Thirty-fourth Street
Los Angeles 7, California

School of Dentistry
College of Medical Evangelists
Loma Linda, California

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School of Dentistry
Georgetown University
3900 Reservoir Road, N.W.
Washington 7, D. C.

College of Dentistry
Howard University
600 W. Street, N. W.
Washington 1, D. C.

GEORGIA
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Atlanta-Southern Dental College
Emory University
106 Forrest Avenue, N.E.
Atlanta 3, Georgia

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Loyola University
1757 West Harrison Street
Chicago 12, Illinois

The Dental School
Northwestern University
311 East Chicago Avenue
Chicago 11, Illinois

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University of Illinois
808 South Wood Street
Chicago 12, Illinois

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Indianapolis 2, Indiana

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College of Dentistry
State University of Iowa
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University of Louisville
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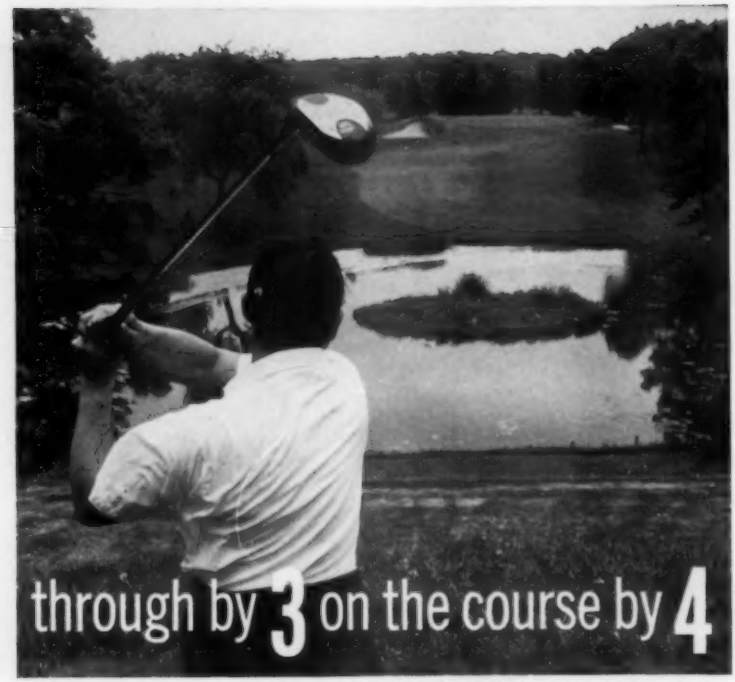

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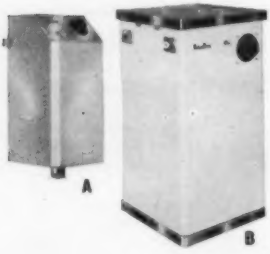

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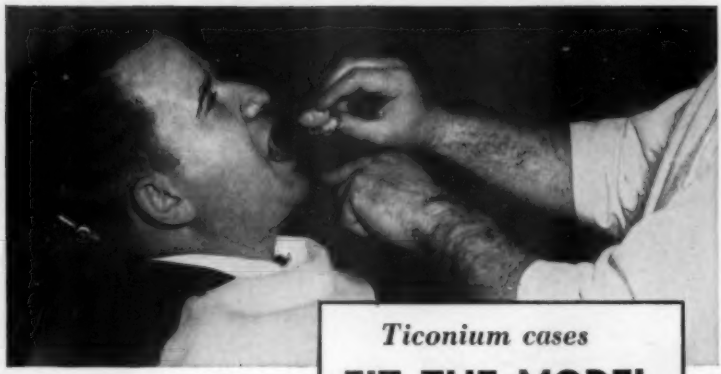

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Because it consists mainly of slowly available polysaccharides with relatively minor amounts of dextrins and simple sugars, the carbohydrate of oatmeal does not tend to cause a sudden, sharp increase in blood sugar. Instead, the complex carbohydrate molecules gradually release glucose into the blood stream and thus provide energy on a more sustained basis. Oatmeal is therefore logically recommended as an excellent breakfast dish for diabetics.[2]

The carbohydrate content of oats is almost completely digested and utilized. Cellulose, or cellulose-like material, representing only about 2 per cent of rolled oats in the dry form, provides a gelatinous residue which serves advantageously as nonirritant bulk in the lower intestine.

Whether eaten for therapeutic reasons during illness or for a good sturdy breakfast every day, oatmeal and milk (skim or whole) assures high biologic quality protein, vitamins, and essential minerals, in addition to ease of nutritional utilization.

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1. Kent-Jones, D.W.: Modern Cereal Chemistry, ed. 3, The Northern Publishing Co., Liverpool (1939).

2. Heupke, W., and Kolb, A.: Mechanism of the Beneficial Action of Alimentation of Oats in Diabetes, Deutsche Ztschr. Verdauungeskr. *13*:111 (1953).

DENTAL AUTHORITIES stress the importance of optimal nutrition in the aim toward better dental health during the early growth years. Oatmeal, with its wealth of essential nutrients, not only contributes broadly to good nutrition, but—since its carbohydrate is not readily degraded to simple fermentable sugars—is of virtually no cariogenic influence.

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[Council on Dental Health: J.Am.Dent.A. *47*:387 (Oct.) 1953].

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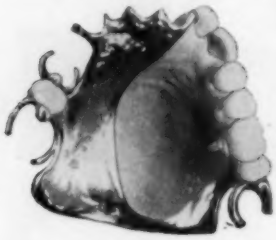

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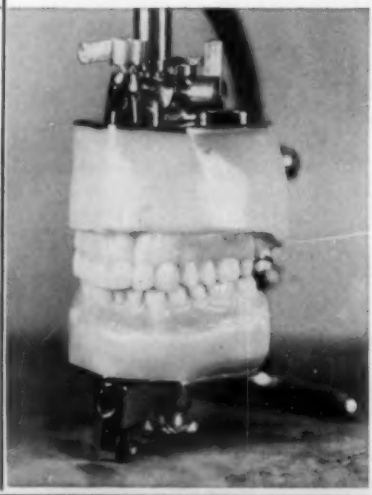

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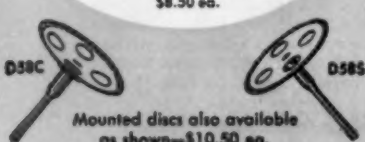

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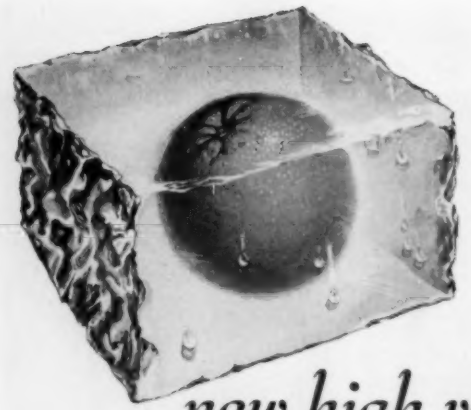

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30 mg.—infants to 1 year of age	4¼ tablespoonfuls	

Florida Citrus Commission, *Lakeland, Florida*

1. J. Agr. & Food Chem. 4:418, 1956.

2. A.M.A., Council on Foods & Nutrition: J.A.M.A. 146:35, 1951.

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*For minimal prophylactic measures against subacute bacterial endocarditis, see "Accepted Dental Remedies, 1957," p. 63, published by the American Dental Association.

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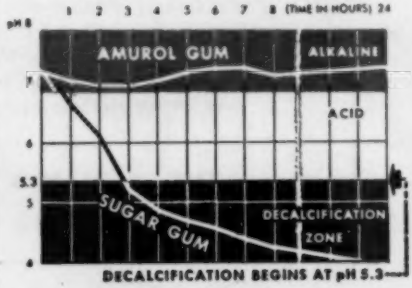

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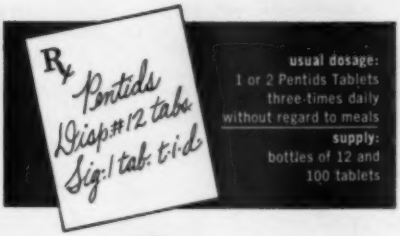

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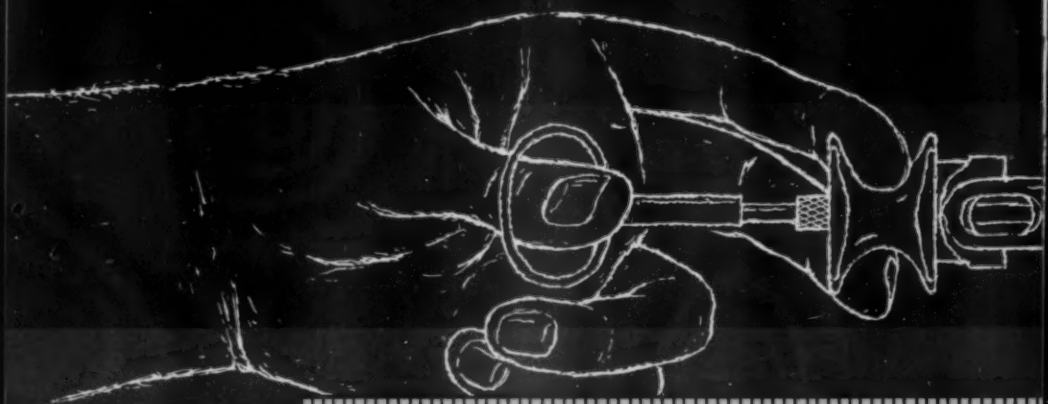

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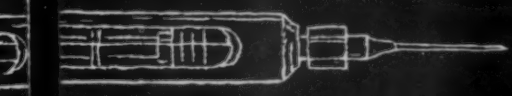

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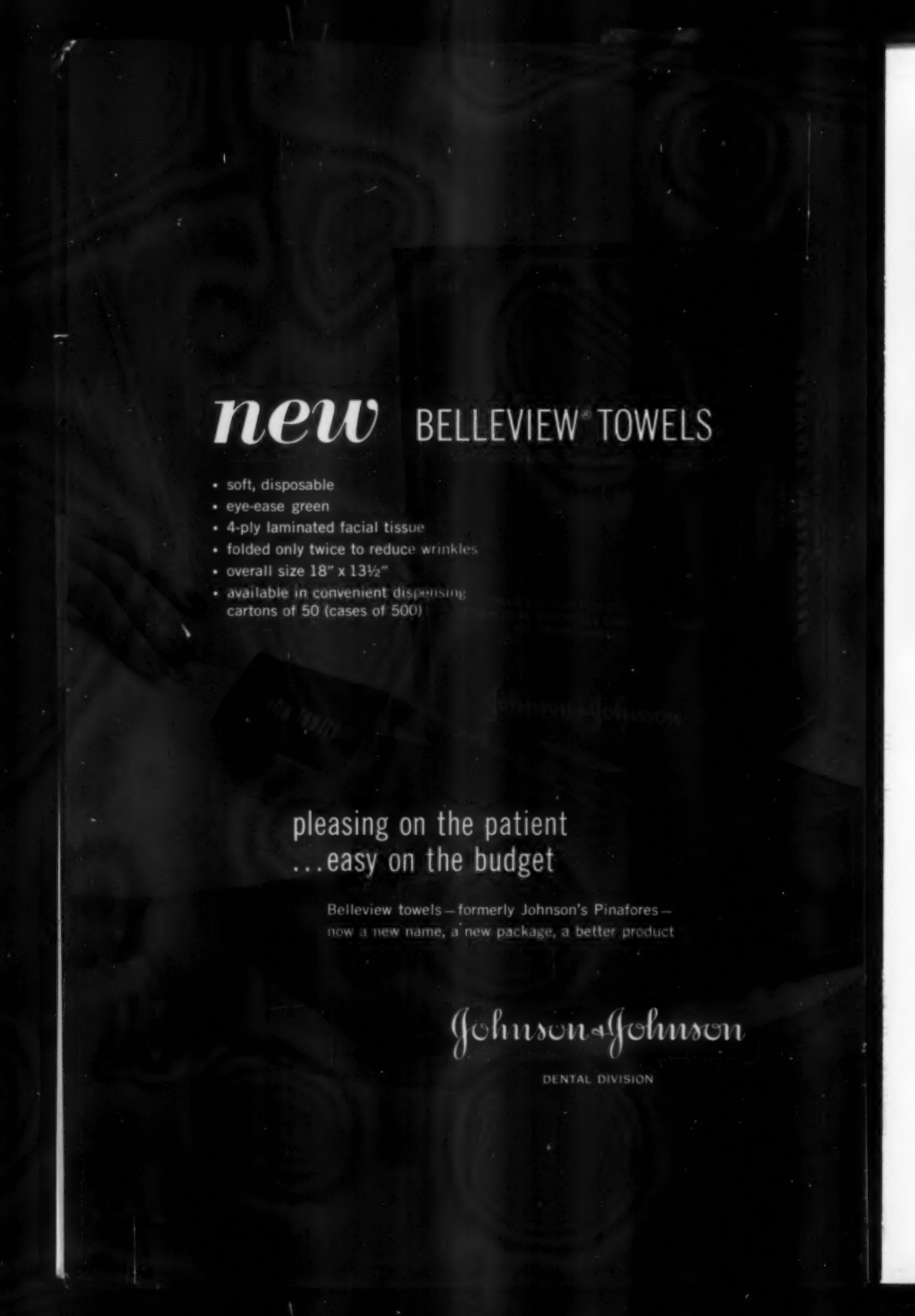
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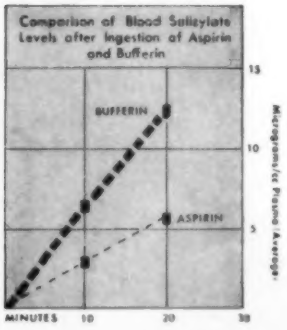

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